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NOTES.

ICE FOR WINE FERMENTATION.—Wine-makers desirous of securing a supply of ice for the purpose of controlling fermentation in the vats during vintage can obtain same on the terms of previous years. Applications to be sent in to the Director of Agriculture, Perth.

WINE FERMENTATION.—An article by Mr. Despeissis on "Wine Fermentation and Sulphur as a Controlling Agent" could not be completed in time for the present issue, but will appear next month. Advance copies will be forwarded to wine-makers on application, in time for this season's vintage.

FLAX.—It is about time that our farmers gave a little attention to flax growing. It is easily grown, and in suitable soil the yield, both of seed and flax, will repay all labour. In any of the Southern districts it ought to do well. Our importations of oilcake is far too large, and the bulk of it, if not all, should be locally produced.

AN ASSISTANT ENTOMOLOGIST.—Before the Government Entomologist (Mr. George Compere) left on his last trip in search of orchard pest parasites, he was commissioned to keep his eyes open for a scientist to fill the position of assistant entomologist to the local Department of Agriculture. The Acting Director (Mr. Crawford) has received a cable from the Agent General (Mr. W. H. James) conveying the intelligence that Mr. Compere had recommended a Mr. Low for the position. Mr. James has been requested by cable to complete the engagement.

IMPORTED STOCK.—It is pleasing, in reviewing events of the past year, to notice the very large increase of pure-bred stock of all kinds. Ayrshires have been the favourite dairy breed. In pigs, large blacks seem the most popular, while quite a number of Berkshires have also been imported. Some splendid stamps of horses have been introduced, amongst which are a few Suffolks, the best of all horses for the farmer. Sheep, goats, turkeys, fowls, and ducks have also been brought from all parts of the world. There should be no trouble now of anyone procuring the best of anything required. In no case is the saying of spending a pound to save a penny so applicable as in buying pure stock; so if you want to make money by breeding, then pure stock cannot be too good.

ORCHARDS.—The worst orchard pest is the man who plants an orchard without proper preparation of the ground, then gives indifferent cultivation for a few years, seeds down to grass, which is cut off in July and fed to a scrub cow that is incapable of producing more than half-a-pound of butter per day. The ground is left dry, hard, and bare just at the time when a large amount of moisture is needed to develop and mature the fruit. Under some conditions the growing of grass among the trees may be the right thing to do, but with the certainty of dry weather and lack of moisture in January and February, the grass should either be left as mulch to cover the ground or replaced with a good top dressing of stable manure, to shade the ground and conserve the moisture. When the grass is fed to the cow, it ought to be a good cow, one that will make a profitable use of it. The manure should be kept under cover until carted to the field and applied to the soil, not pitched out under the eaves of the barn to have its fertility leached out by the rains, nor left in conical heaps to heat and fire-forge.

CHERRIES IN WESTERN AUSTRALIA.—A further evidence, in addition to that already published in a former issue, of the suitability of some parts of this State for the cultivation of the cherry is given by Mr. Wm. S. Hains, of Cuballing, who sent to this department four very good samples of the following varieties:—St. Margaret, Napoleon Bigarreau, Waterloo, and Kirk. The first two especially are very fine. Cuballing, which is close to Narrogin, has an altitude of about 1,000 feet above sea level. From that point to Mt. Barker, a distance of 150 miles, cherries have proved themselves fruitful, and that fruitfulness increases as one travels towards Wandering, the Williams, Kojonup, the Preston, and the Blackwood. Better methods of packing have of late years led to a considerable importation of cherries from the Eastern States. It is expected that the importations this year will amount to £10,000 worth. In order to guide fruitgrowers, and determine which are the most profitable cherries to grow under conditions which obtain here, it is recommended that an area of one and a-half acres or so of suitable land be planted with cherries at the Narrogin State farm.

AN ORCHARD PEST.—The Acting Director of Agriculture (Mr. A. Crawford) has received an interesting report of the successful efforts which have been made during the past year to combat the mussel scale. The scale is a great pest of apple trees in various parts of the world, and affects other fruit trees, although the apple is its particular preference. In Tasmania it has proved even more troublesome than the codlin moth, but in this State the affected area has not been allowed to assume large proportions. The scale has been confined to the Hay and Plantagenet districts, and in 1903 ten orchards, with an aggregate of 264 trees, were more or less badly affected. The vigorous policy of the Department, however, resulted in the pest being not only checked from spreading, but fought back. In five orchards the scale has been eradicated, and by the end of last year the number of trees affected had been reduced to 197. The most effective method of fighting the scale is by the use of the lime, sulphur, and salt wash. Fumigation has not been so successful, owing mainly to the fact that the eggs last right through the year. The report concludes with complimentary references to the inspectors who had charge of the work.

INSECT FRIENDS.—Ichneumon flies and their near relatives usually lay eggs in the bodies of caterpillars, grubs, and aphides, but some species deposit their eggs in chrysalides and in the eggs. These insects, though called ichneumon flies, do not in any way belong to the order of flies proper, which are two-winged insects, but they are classed in the same order as the saw flies, ants, bees, and wasps, and, like them, have four wings. They are nearly all slender in form, and have long legs—the upper pair of wings being considerably larger than the lower pair—whilst the end of the body in the females is furnished with a long pointed organ, known as an ovipositor. In some species this organ is of great length, being longer than the rest of the insect, and enables the possessor to reach its victim, which may be a wood-boring grub, or so placed that it would be inaccessible to the insect otherwise. In other species it is quite short, and may be entirely hidden in the body of the insect when not in use. The ichneumon flies do not try to kill their victims by piercing them with their ovipositors; their only desire is to lay their eggs within them. As soon as the grubs are hatched they begin to feed on the juices of their host! Caterpillars attacked by these parasites live and feed for some time, and have been known to become chrysalides, but this effort on their part is generally more than they can manage. Several of the smaller species attack various kinds of aphides. One may often see on plants a large brown aphis with a swollen rounded body—the result of infestation by one of these parasitic insects; the latter vary much in size, from insects somewhat larger than those shown in the figure to others about the size of a midge. They are generally black-brown or some dull colour, though some have a bright band across the body.

DETECTING INSECTS INJURIOUS TO CORN.—Injuries to the roots of corn in spring and early summer may be indicated to the close observer by the aspect of the growing crop. If the corn fails to appear in spring (says *Orange Judd Farmer*) the difficulty may not be due to poor seed or to injuries in the kernel, but to an early insect attack upon the young roots. This may even kill the plant outright before the sprout has broken ground. The root louse of the corn and the wireworms are most likely to be concerned in this form of injury. Later, when the plant is a few inches high, the uneven growth of the corn will often attract attention, patches here and there advancing slowly in comparison with parts of the field adjacent, and in a way not to be accounted for by differences in soil. In such cases white grubs, wireworms, corn-root worms, or plant lice should be sought. Combined with this uneven growth, or possibly in time of drought without it, the farmer may notice yellow patches in the field, the colour being the most pronounced on the lower leaves. The root louse of the corn will be found responsible in most cases for this partial discolouration, but any of the species just mentioned may produce a similar effect, or it may be caused in the lower part of the stalk by the chinch bug. An especially significant symptom of more or less serious mischief is the presence in the field of numerous burrows of ants, commonly placed in or immediately near the hills of corn and most conspicuous shortly after rain. This invariably indicates the presence of root lice in the field, although, if the corn be small, a careful search may fail to detect them at the time. The nature of the association between the ants and the root lice is such that the former prepare the way for the latter early in the season by sinking their burrows among the corn roots, thus giving the lice access to them.

THE NITROGEN SUPPLY.—Some imaginative minds have been conjuring up visions of dire results that are to come about through the cultivation of legumes (says the *Prairie Farmer*). The crusade for the larger use of the nitrogen-gathering plants in agricultural practice, they fear, will so reduce the supply of nitrogen in the atmosphere that everything will burn up. A writer suggests that "it will be many years before what is known regarding nitrogen gathering will be diffused through the mass of ignorance that prevails, and consequently it will be a long time before there will be less nitrogen in the air, because it has been stored up in the soil for man's benefit, and longer still before we shall have replaced the stores that Nature had accumulated through long centuries." No one need have any scruples against growing leguminous crops on the score of robbing the atmosphere of its nitrogen. As practically four-fifths of the total volume of the atmosphere is nitrogen, all of the latter that can possibly be secured and stored up in the soil at any one time will have no appreciable influence upon the composition of our atmosphere. Those who are prone to speculate on this subject should note this fact. However much nitrogen we may secure, our retention of it is only temporary. Sooner or later it returns to the air whence it came. It is constantly escaping from the earth, through various avenues, and returning to the atmosphere. From the chimney on the house-top, the neglected manure pile, and even the neglected waste places about the farm, it is constantly rising. Its unstable character when in combination, and its tendency to escape when these combinations are broken up, are responsible for the difficulty experienced in keeping the soil adequately supplied. We may locate it temporarily in leguminous crops, but the consumption of these crops, and the decomposition of the refuse by bacteria, starts it on its way back to the atmosphere to be again taken up by leguminous crops. The problem of the farmer is to keep a sufficient quantity of this element moving on its endless round to insure the production of bounteous crops. He need have no fear that the supply of seventy-five million pounds that is hovering over each and every acre of his farm will not meet all his needs, if he will but employ the proper means to secure it. No farmer need purchase nitrogen from another individual, for Nature has provided him with a bounteous supply, and with a means of drawing upon this supply free of cost.

SHERRIES.

By A. DESPEISSIS.

Port wine and Malagas have already received attention in previous chapters.* In the present one I will cull from my note-book some concerning the secular methods practised in the manufacture of Sherries.

Andalusia is the gridiron of Spain. Its high tableland is deeply cut by mountain torrents, which, rushing from the steep sierras, run to feed those rivers which empty themselves into the sea, the natural boundary of the Peninsula. These torrents have almost laid bare in places those steep roasted slopes, and carried down in their rush towards the lower country a wealth of sand, earth, and stones worn into pebbles, which in different proportions make up the cultivated soil of the arable country.

From Malaga we retraced our steps back up the Valley of the Guadalhorce, leaving behind us the Bay of Malaga, dotted all over with white sails, and streaked with lines of smoke. The train runs through sugarcane and cotton fields, and by irrigated gardens and vineyards which give evidence of almost tropical luxuriance.

The wines, mostly *moscatels*, are pruned to one eye, and form a kind of knob from which shoot out the fruitful canes. These shoots are not staked but left to run on the ground. About midsummer the earth is hilled up around the stump, partly to allow the ripening bunches to hang down free off the soil, and partly, it is contended, to bring the roots closer up to the sun-heated surface and thus add to the sweetness of the grapes.

By degrees, as the railway line rises, the ravines only are cultivated, the mountains being mostly barren. In places olive trees occupy the ground, and now and again grain crops or vines are cultivated amongst the olives. As it does not rain for several months at a stretch, both grass and weeds are scarce. What cultivation is done is mostly done by hand labour, and is certainly not overdone.

After three hours of strenuous efforts the express stops at Bobadilla, the junction for Granada, Madrid, Sevilla, or Gibraltar, where meals are offered which do not reek with crude oil or garlic.

It is always good policy in Spain, if time is of any moment, not to diverge from trunk lines, and to travel by the so-called "express;" as "post" and "mixed" trains are either dead slow or erratic. At buffets and hotels, beware of the common wines of Spain; it is only too often most rascally stuff, generally made worse by its association with hide bags made of calf's or goat's

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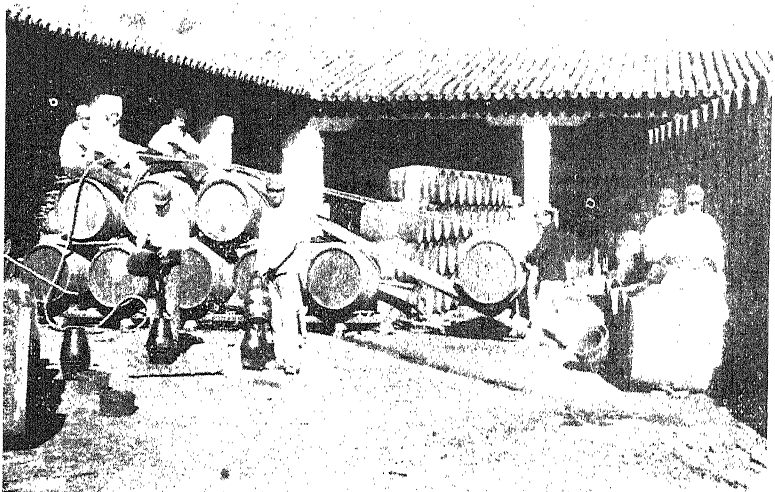
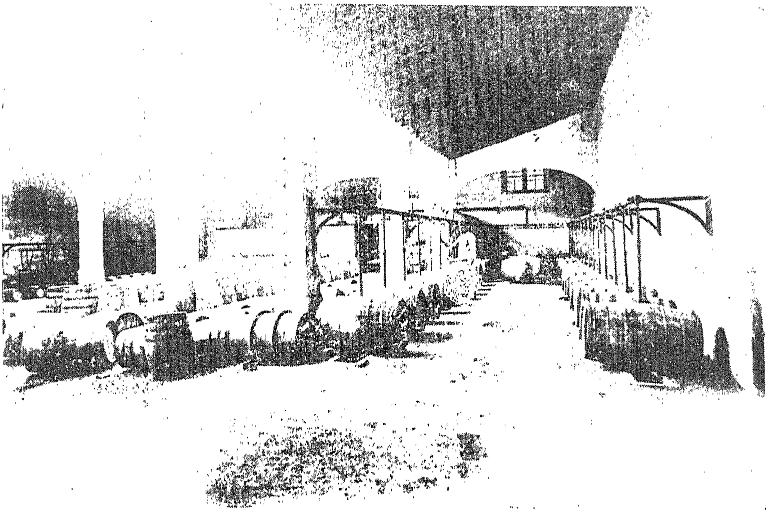
* Port wine, page 212, Vol. IX., Malaga wine, page 458, Vol. X. of the *Journal*.

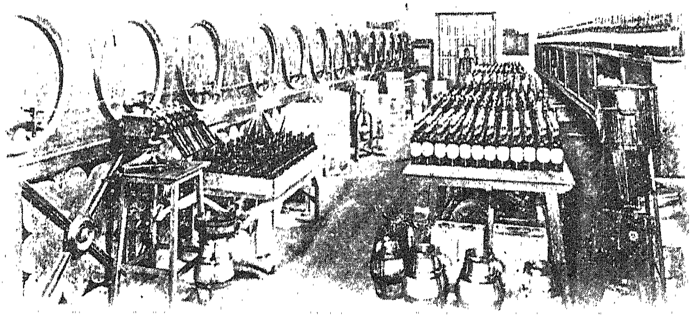
Sherry Soleras.



Stacking up Sherry Pipes.



Steaming Sherry Butts.



Bottling Department.

skin, in which it is kept. Not uncommonly, it is made more fiery by an admixture of *aguardiente.* There are noble exceptions.

Valdepeñas (pronounced Val-de-peinias), under reputable labels, is a very creditable wine, which they say was in repute even when the Romans held Iberia.

Rioja (pronounced Rioha), on the Ebro, near Logroño, produces some of the best table wine I have tasted in Spain. It much resembles our honest, generous, Swan red wines, made of Shiraz and Malbec. To Mr. W. May-Lindsay, the British Consul at Almeria, I am indebted, together with many other useful hints for guidance when on the road in Spain, to becoming acquainted with that wine. I have always found it pleasant, honest, and of uniform quality. It is made mostly of claret grapes imported from France and manufactured according to Bordeaux methods. Its strength varies from 11° to 13° of alcohol, and it is endowed with a rich ruby colour. As a rule Spain cannot compare with France or the Rhine in the production of light, delicate wines, but on the other hand, in the confection of sweet, liqueur wines, or the preparation of dry, spirituous, and aromatic white wines it occupies an unique position amongst all wine-growing countries.

The country traversed in the direction of Sevilla and Jeréz consists to a great extent, at least when I saw it at vintage time, of extensive, desolate-looking plains. No houses on these plains; they mostly live in villages in Spain, and between the villages there is little sign of life. At intervals a farm house (*hacienda*), looking like a fortified place, with few windows and enclosed within high walls, break the monotony of the landscape. Then a well, round which a herd of *toros bravos* congregate while their herdsman bails water out for them. They look there as peaceable as milch cows; although bred from fiery blood, they seem quite unlike the maddened bulls which, in the arena, are goaded into infuriated beasts. A well-bred bull of good lineage is worth about £70 as it is done to death by the matador, after having provided some excitement to the crowd gathered around the bull-ring. Some six to twelve bulls are there done to death in the course of a bull-fight.

The Andalusians of now-a-days have many a trait in common with the Moorish conquerors. The music and the dances remind one somewhat of the Orient. In their steps, their songs, accompanied by some virtuoso on the guitar, their themes of love and war, they put one in mind of the Indian nautchnees, and I am told of the Egyptian almehs. The national costumes are, as a rule, noticeable for their Oriental colours, where the blue, the red, and the yellow predominate, while almost every word descriptive of soil, implements of husbandry or irrigation is Arabic. At last, after a whole day's travelling, *via* La Roda and Utrera, we arrive at

JEREZ DE LA FRONTERA,

which is pronounced "hereth" and is also spelt Xeres; the surname *de la Frontera* it owes to the fact that once it was a border town of the Moorish possessions in Spain. The town is a populous one and has about 60,000 people. It is one of the most prosperous towns of Spain, and its sherry magnates do an extensive trade with every part of the globe, although of late years they complain of a shrinkage in the volume of their business. It is with the neighbouring townships of La Rota and San Lucar de Barrameda, the most celebrated centre of the manufacture of the crisp, amber-coloured, dry, aromatic wine known under the name of Jeréz in Spain, Xérès in France, and Sherry in England, as well as in other parts of the world.

Other districts as well supply in a small measure their quota to the stock of the sherry manufacturers.

Rising early in the morning, a stroll about Jeréz gives one an idea of how the catering of the milk supply is done in Algeria and Spain. Herds of the small, smooth-haired, red Spanish goat leisurely parade the streets, whilst the herdsmen cry out *Leche! Leche!* in a high note. In response to this shrill call people come out of houses with jugs and pails, a nannie goat is hooked by the leg, and the foaming milk runs into the vessel. Milk carts and milk shops are unknown quantities in these countries and police court prosecutions for watering milk must perforce be a rare thing.

Around squares and along some of the broader streets, date palms and orange trees are planted; the latter cutting a sorry figure amongst the luxuriant vegetation around.

Pressure of time put me in the field early in the forenoon, and after duly presenting my credentials to some of the representative sherry magnates at their *Bodegas*, I was given an opportunity of going round some of these extensive establishments.

The country about Jeréz is not particularly picturesque. It is made up of sandy ridges (*arenas*), with here and there patches of chalky soil (*alvariza*) or of clayey soil (*barros*).

The "arenas" or sandy vineyards produce a very dry and crisp wine. The "barros" or chalk vineyards, which consist of a greyish cement-looking soil like mortar, produce mostly sweet wines. The chalk vineyards produce the high-class Sherries.

The first two average 260 gallons to the acre, whilst the chalk vineyards only yield about 200 gallons. Quality here makes up for quantity.

VARIETIES OF GRAPES.

Amongst the varieties of vines generally planted for dry sherries are first and foremost the *Palomino*, which is one of the first to ripen, and produces some of the choicest dry Sherry, the *Albillo castillon*, the *Mantuo de Pilas*, the *Mollar* (pron. *Moyar*), and the *Perruno*.

For sweet wines the favourite varieties are *Pedro Ximenes*, *Moscatel*, and *Tintilla de Rota*.

Pedro Ximenes is a favourite alike for dry or for sweet wines.

Sherry Vineyards around Jerez.

Coopers at work.

All these kinds are planted together, without any apparent system; one would think that the cuttings had been shuffled previous to planting. It is contended that a more harmonious wine is thus produced.

Vintage generally begins early in September, and I had an opportunity whilst at Jeréz to see grape-picking on some of the hillside chalky vineyards, where the *Palomino* grape predominates.

PICKING.

The picking is made with great care, and the vineyards are gone over several times as the grapes ripen.

Men and women are engaged grape-picking, and only receive one *peseta* (nominally 10d.) a day.

The grapes are placed in wooden boxes wider at top than bottom, and carried on the head. When filled these boxes are carried out of the vineyards to the drying-place or *almijar*, where esparto-grass mattings, about two feet six in diameter, are laid on the ground, and the contents of each box is tipped over a mat; there the grapes are left to wilt for a period, which varies with the state of maturity of the grapes and the purpose to which they will be turned.

For dry sherries a couple of days suffice, whilst for sweet wines made of *Pedro Ximenes*, of *Moscatel*, and *Tinto* grape they are exposed to the sun for a week or more.

TREADING AND FERMENTING.

In the larger and more up-to-date wine cellars, modern machinery is beginning to be introduced, but at the majority of vineyards these wilted grapes, after their period of insolation, are even now trodden. For that purpose, a succession of *lagars* or treading platforms are provided and arranged in rows: they have a raised wall all round, and are like those in use at Malaga and at Oporto. In the centre, which is raised, stands a screw press, generally of antique design. On each "lagar" are placed sufficient grapes to fill a butt or pipe of wine, and over these grapes four or five pounds of powdered gypsum are strewn; or, better still, a smaller quantity of pure sulphate of potash. Then the treaders light their cigarettes and set to work. The strained juice runs direct into the fermenting pipes or butts (*botas*) which hold 150 gallons, and these in turn are conveyed to the cellars (*bodegas*), where fermentation proceeds. These butts are not quite filled, and one-sixth of their capacity is left ullaged. The pressings, as well as the free running juice, are fermented together. The trodden grapes are shovelled up around the screw press, and a cake formed, which is wound up in an esparto rope coiled round it.

After this first pressing the dry cake is broken up, and the lumps rubbed over a stemmer set in an oblong frame and the stalks are separated. The skins are then slightly moistened and pressed again, after being allowed to stand a while. The liquid which comes out is fermented by itself into a "piquette" wine, which is either consumed by the vineyard hands or is distilled into spirits of wine used for fortifying sherries and sweet wines, or else turned into excellent wine vinegar, which is reared with all the care of sherry itself.

This is about the extent of the small vinegrowers' operations at their "lagars," as from this stage art and experience combined step in, and it is in the merchants' *bodegas* that the requisite attention is bestowed upon the young wine.

The pressed must is conveyed to the town *bodegas* much after the style favoured at Malaga, or else in butts placed cn long two-wheeled carts drawn by a scratch team of mules, horses, and donkeys, promiscuously hitched in a string, one in front of the other, and stretching out a long way.

In the *bodegas* the young wine undergoes the usual fermentation, which is followed by a more or less lengthy, slow fermentation, and when quite dry it is fortified with well-rectified grape spirit. The degree of fortification varies with the type of wine it is sought to obtain, the more delicate wine receiving less spirit.

Towards the end of the first winter and a few months after making, the young wine undergoes a preliminary classification, and is syphoned out into specially-seasoned casks, which are steamed and washed with care, and afterwards kept filled with water, which is renewed every now and again until required for use.

These casks are generally made of American oak, whilst at Oporto, Dalmatian and Dantzig oak is preferred. The American oak staves are said to impart a peculiar degree of bitterness to the wine, which, if anything, improves sherries.

At the time of this first racking, two to two and a-half gallons of grape brandy is added to each pipe. This enables the wine to stand the summer without any accident. Early in the autumn it is racked a second time and definitely classified. The fortification is done with brandies of proof strength for young wines, and spirits 60deg. o.p. for older wines, the strength of matured sherry rising by successive additions of spirit from 13° to 14° to 18° or 19° of alcohol per cent.

Those wines that are thin and weak are further fortified, and those which are not clear and brilliant are fined. The second year the young wines are again racked twice, viz., in the spring and the autumn, after which they are allowed to mature in the *soleras.*

These *soleras* are mother casks of the finest wines. They are generally stacked in three tiers, one above the other, in above-ground cellars. The casks are numbered; they are not quite filled, one-ninth to one-tenth of the contents of the casks remaining ullaged. When the wine is two years old, and has been finally classified, they are not racked any more, in order not to interfere with the growth of a whitish fungus which soon appears on the surface. That fungus is not unlike that which is known as "flowers of

Sherry Soleras maturing under trees outside the Bodega.

wine," or even as "mother of vinegar;" its presence is more beneficial than injurious to the wine.

In order to further favour its growth, the bunghole is not hermetically closed, and a porcelain cap resting over it keeps off the dust; that cap is tied up by a string to save it from breaking.

After a period of time, which varies with the wine, it becomes sufficiently matured to sell.

When making up a shipment of sherry or executing an order, individual casks are not sent away, but a measure of wine is drawn from each individual *soleras*, and the number of casks intended for shipment are then fined or clarified. For that purpose fresh blood, white of eggs, or Spanish clay is used.

After the required quantity of wine has been withdrawn, an equivalent quantity of a younger wine of a like type is put back into the mother *soleras*. In a few months the new addition is as good as the original wine, the growths present in the casks having imparted to it the same characteristics as the parent possessed.

It does not matter whether these *soleras* casks are housed inside costly cellars or stacked outside under shady trees, or even exposed to the ardent sun of Andalusia; the process of maturing goes on just the same, and is probably accelerated when the casks are exposed to the full action of the sun.

Around the Jerez *bodegas* large stacks of *soleras* casks are a familiar feature of the landscape, and some *soleras* I was shown contained ethereal wine vinegar, which is costly enough to be only consumed by wealthy epicures. Within a stone throw, other stacks of *soleras* casks are seen, which hold aromatic sherries of considerable value: all receive the same kind of treatment, without apparently being the worse for it.

Even brandies are at Jerez reared in *soleras* after the fashion of sherries, and at Gonzalez, Byass, and Co.'s Rotunda Bodega, I had occasion to sample a *soleras* brandy that has left the most pleasant recollection.

The value of a butt of sherry is an elastic quantity, and varies from £15 to £100 a butt of 110 gallons. For £20—about 4s. a gallon—a very ordinary kind of sherry is obtained; but for a good wine no less than £30 must be given.

It is easy to understand that by following with method and care the method of rearing in *soleras* or breeding casks as practised at Jerez, the same standard of quality of a wine sufficiently spirituous to stand that peculiar manipulation can with ease be kept up. Whenever a few *arobes* of sherry, brandy, or vinegar are removed from *soleras* butts, an equivalent of a newer wine of the same type is restored to those same *soleras* butts, and in the course of a few months the whole contents of these breeding butts is as good as it was before, and fresh abstractions, accompanied by corresponding restorations, can be made. When this is done with judgment—and here experience is invaluable—there is no end to the period *soleras* can be perpetuated, and some of these are 50 and even 100 years old. In other words, the original mother of sherries was of that age, periodical subtractions and additions must necessarily rejuvenate it, and receive from the *soleras* cask the same stamp of old age which is the distinguishing feature of the parent wine.

At some of the *bodegas* I visited I tasted collections of sherries of various types, and was explained the difference between an *Amontillado*, which is a crisp, dry, and spirituous and ethereal wine, and an *Olorozo* sherry, which is not quite so dry and is a full-bodied, nutty, and generous wine; a *Manzanilla*, on the other hand, is lighter in colour and in body, and possesses the peculiar aromatic bitterness of camomille. The best *Manzanilla* is made from grapes grown on the *arenas*, or sandy vineyard of San Lucar.

So varied is the turn which several casks of sherries made from the same grapes take, that I had no difficulty, after fermentation, in picking out an *Amontillado* and an *Olorozo* sherry made from like grapes grown on the same ground and fermented at the same time,.but in different butts.

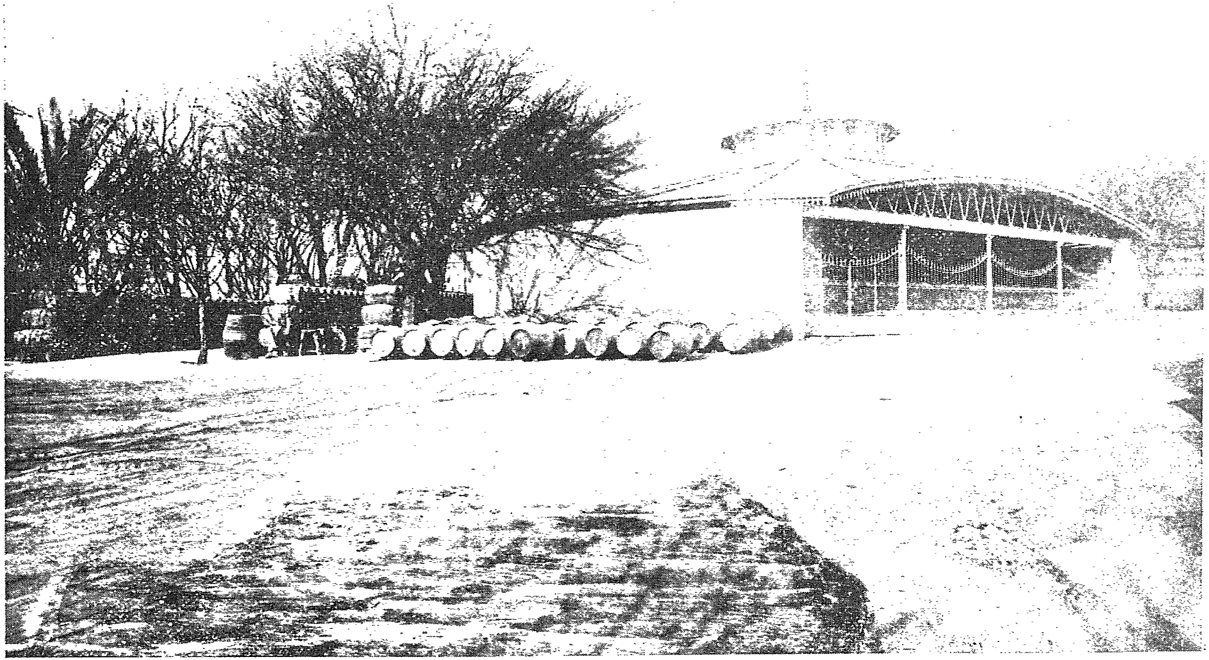
An inspection of some of the larger *bodegas of Jerez* is almost as interesting as a visit to a picture gallery, and as one walks along the long lines of *soleras* one is introduced in turn to casks named after Kings or infantas of Spain. One huge cask at one of these *bodegas* is called Napoleon; at another I tested sherries from E.I., which stands for East India, the contents of that *soleras* having once made the voyage across the line. I also saw, but without testing any more, casks reverently known as Methusalem, the Apostles, and last, but not least, "Christ."

CALF REARING.

(Continued.)

By R. E. WEIR, M.R.C.V.S.

DIARRHŒA.—This term is used to express an irritable state of the bowels by which the contents are expelled in a fluid or semi-fluid state, without exhibiting any of the symptoms common to inflammation. It is one of the most common ailments to which calves are subject, and at times is not only fatal, but appears in an infectious form. The disease may be caused by an alteration in the state of health of the mother if the calf is still sucking, but usually it is amongst hand-fed calves that the trouble is noticeable.



Gonzalez, Byass & Co., Rotunda Bodega, at Jerez.

Nature provides that young calves when sucking should swallow in small quantities, the head and neck being in an extended position whilst so doing; by this means the food supply is taken direct to the true stomach, where it should undergo thorough digestion. The positions are practically reversed with hand-fed calves, as these are usually fed from a vessel which rests upon the ground. A dependent position is thus forced upon the animal, and as the quantity consumed with each swallow is considerably greater, a portion may find its way into the rumen or paunch. Should the irritation continue for any length of time the food ferments and ultimately results in diarrhœa. As a preventive against trouble arising from this cause, an artificial teat is now being used for feeding purposes in many large establishments, and the results have been of a most favourable character. The cause is also often associated with neglect in giving the first of the mother's milk to the newly born calf, a common practice with many being to mix the whole supply together, and feed to the young and old alike. Care should be exercised in this direction, as the first milk contains properties of an aperient nature which are necessary for the cleansing of the bowels from all deleterious matter, and prepares them for the more thorough digestion of the food supply. Improper sanitary conditions are also frequently responsible for diarrhœa. It is no uncommon practice for dairymen to house their calves in a dark unventilated corner of a building where foul air accumulates and where disease is generated. This should never be permitted, as it is more economical to rear calves under favourable conditions than the reverse, and any cause which prevents the healthy growth of an animal when young practically affects them in after life. As pointed out in a previous article, disease is often associated with the calf paddock, and from whatever cause diarrhœa may be brought about, it rapidly spreads, per medium of the pasture, to others, and assumes an infectious form. The first noticeable symptoms are dullness, capricious appetite, and fluid discharge from the bowels; this is followed by severe straining and signs of weakness. The calf lies down a great deal, the eyes appear sunken, frequently becoming more or less unconscious, and dies without a struggle.

Immediately the disease becomes noticeable the affected animal requires to be removed to a well-ventilated building, and the infected premises thoroughly cleansed and disinfected. Medicinal treatment should first be directed towards removing any irritable matter from the digestive canal, and no better aperient can be utilised for this purpose than castor oil. In the event of pain being present, the addition of about 30 drops of laudanum will afford relief. When the abdomen appears swollen from flatulence, two to four dram doses of ether is to be given, and should the diarrhœa continue lime water, or well boiled starch gruel, can be added to the milk supply. Small and frequent supplies of food are necessary throughout the complaint.

(*To be continued.*)

POULTRY APPLIANCES.

By FRANK H. ROBERTSON.

Poultry keeping entails constant attention, whether the number be only a few hens kept in the back yard for household egg requirements, or if raised by the hundred. The larger the number the greater the work. But it behoves every poultry-keeper to make the burden as light as possible by systematic management and an adequate supply of suitable convenient runs and labour-saving appliances.

There are, however, many persons who do not believe in going to the expense of labour-saving appliances, and are quite satisfied to struggle along anyhow. I knew a butter-maker who sold butter in 1lb. pats and possessed nothing beyond a dish or two and an old pair of scales (and these were even minus weights), their places being taken by stones, which were somewhat under standard requirements. A skimmer was not even considered necessary. The cream was pushed off the top of the milk by hand into a bucket and then churned by the tedious process of hand-whipping. The weighing off was also managed on strictly economical lines; one stone weighed 14lbs. and the other slightly under 16ozs., thus enabling the seller to produce 15 supposed 1lb. pats from 14lbs. of butter. The surroundings of this primitive dairy were on a par with the butter-making appliances. The milk was kept in the ordinary sitting-room and kitchen combined, which was badly off for windows. The most convenient way of ascertaining whether the moon had risen or the rain had ceased was by looking up the chimney, which was not one of these new-fangled, narrow-gutted brick erections which can only be used for carrying off smoke; there was ample room for hanging the bacon and hams. The fireplace was also a real cosy corner of a cold winter's night.

Disaster, however, in course of time came over this dairy. The storekeeper and private buyers of butter found out how things were managed, and preferred to get their dairy produce elsewhere. Sickness broke out; the health authorities appeared on the scene and condemned the premises.

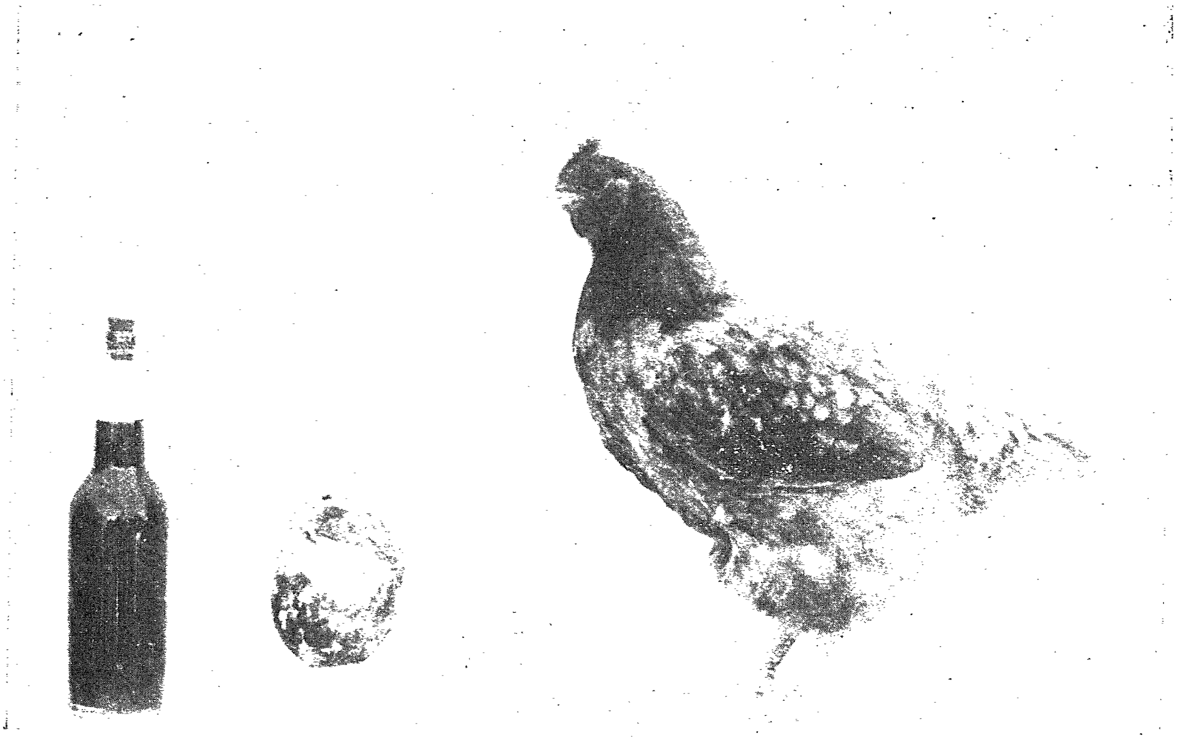
The reader will perhaps ask what has this to do with poultry? The answer is, what applies to one also applies to the other, for without proper appliances and strict attention to cleanliness and sanitary arrangements, poultry-raising is likely to result in failure; and in touring round the farms of Western Australia it is remarkable the meagreness of proper facilities for conveniently attending to the fowls. This is particularly noticeable in the raising of chickens. It is but seldom one sees such a thing as a movable coop for the hen and her young brood. It is a very simple matter to make; a water-proof roof is required, no floor, a draught-proof back, and a slatted front; this can be kept on grassed land and moved daily. The general custom is to let the chickens take their chance and roam about with the full-grown birds. Many are lost by hawks, or trampled under the horses' feet in the stable. Another thing so badly required on farms is a separate run for the cockerels. Just about this time of the year they are becoming a great nuisance; they worry the hens and do not thrive well themselves, and are consequently sent to the market and sold for the table before they are ready; whereas if they are kept in a separate run and well fed for a month or two, they are sent to the market in good condition and fetch a much better price. A better quality of table fowl is what is wanted, or, if the colony system is adopted, it will be found a still more profitable mode of handling cockerels.

I have already advocated this in the columns of the *Journal*, and will now repeat same, and would strongly advise farmers to adopt it, and would be pleased to hear from those who try it and hear how they get on.

The general plan is to use movable houses, best set on wheels to facilitate their transit, and if the front is wired in the fowls can be placed in the new house in the home yard, and drawn by horse-power to a chosen locality. The house need not have a solid wooden floor, inch-mesh wire netting would do, which would also have the advantage of allowing the droppings to fall through on the ground. The house could be moved its own length every week, and the vacated space dug over, thus fertilising the soil with a very valuable manure. A portable house of this description could be made of iron, which is the best material, but a much cheaper and lighter structure would be one made on a light frame and covered with hessian, which, if painted with a good lime dressing to which is mixed some glue or soap, would last for years. Fowls moved in this manner should not be liberated at once on arriving at their new quarters, but should be confined all the first night, and allowed free egress next morning by leaving the door open at night time, and if well away from their former haunts they will ever afterwards keep to the new quarters. In the same manner, if open roosting in trees is preferred, if fowls are taken to their new quarters and placed on the branches at night time, they will keep to the same locality. The colony system could be worked to great advantage on the fields after the crop has been harvested; the refuse grain would afford feed for a long time, and as young growing fowls are plentiful at that time of the year, this would be an economical mode of fattening them off for the market; the supplying of water would probably be the most troublesome part of the work, and again there may be losses from native cats. If such occurs, the house must be made proof against them with wire netting, and the fowls closed in every night and let out in the morning.

If the poultry-keeper takes a live interest in his fowls, the necessity of many appliances will naturally occur to him. In the first place, it will always be found advisable to have a good supply of iron binns to keep the feed in to avoid waste and loss from mice. A good strong grain scoop is a necessity, and for mixing the meal feeds a galvanised iron tub is the handiest; the mixing should be done with a small garden trowel. If fowls are kept in one flock, on unlimited run, the feed should be taken right away from the locality they are in the habit of standing on, and well scattered out on perfectly clean soil, which if well grassed so much the better; but if the birds are kept in pens some receptacles will be required to place the feed on—of which there should be more than one—to prevent the fowls dragging it on to the soil of the pen and eating it off tainted ground. Bags, boards, or sheets of iron do very well for fowls; but for ducks slotted frames are the best, through which the feed is eaten without being trodden on and thus soiled. Receptacles for drinking are difficult to explain unless illustrated, a description of which will be given in next issue. A small mill for crushing grit and grain is indispensable. A machine for cutting fresh uncooked bone is of great service. These machines do not crush bone, but cut it into flakes, so that it can be mixed with the soft food. A small hand chaffcutter, for cutting up greenstuff, is of great use. These machines are advertised for sale in the other States at very moderate prices, but are not at present obtainable here. A rake for gathering up the droppings will have to be made at home, as all garden rakes are too wide between the teeth. An egg-tester is often required. A simple one can be made by cutting a hole in a piece of card-board; but the most powerful are those made of metal and hold a light inside a tube. Very handy daylight testers are also obtainable, which have an arrangement of mirrors, and clearly show the egg when exposed to the sunlight.

If eggs are sold for hatching purposes it is advisable to go to the expense of the specially-made cardboard carriers with a separate division for each egg. The best box of this description has also a double casing, into which chaff is packed. For eggs sent to market the patent boxes, which contain movable trays fitted with wire holders for each egg, will be found better than the ordinary boxes packed with chaff, as breakages are very few. No chaff is required, and eggs will keep well if put into the frames as collected. A very useful coop is one raised about 3ft. off the ground and divided into compartments about 2ft. square. Iron exhibition coops are the best for this purpose, but if the expense is objected to, the fronts alone can be purchased and fixed on to any ordinary coop. There are many other appliances advertised to tempt the poultry keeper, but it is certainly not advisable to go to the expense of many things until they are absolutely wanted, neither is it wise for the novice poultry-keeper to get all the contrivances mentioned straight away, but gradually add to his stock of implements as they are found necessary. The object of these notes is to point out the advantages of certain contrivances as labour-saving ideas to the



A Marvellous Operation (*see* Letterpress).

large number of poultry-keepers who keep their fowls in an unsatisfactory manner, principally on account of the large amount of work and worry incurred owing to the want of proper accommodation and handy appliances.

REMARKABLE OPERATION ON A FOWL.

The accompanying illustration shows a fine specimen of a Buff Orpington hen, which was recently successfully subjected to a remarkable surgical operation by a well-known Perth surgeon. Resting on a plate in front of the hen stands a very large ovarian tumour which was removed from the abdomen of the bird, and alongside is shown a brandy bottle as an object of comparison as to size.

The operation, which was given under chloroform, was neatly accomplished and accompanied with very little bleeding; the incision, about four inches long, then sewn up and bandaged. The fowl has quickly got over the effects, and is now (in three weeks'. time) in first-class condition, and looks like laying.

The fowl had been in the habit of roosting in trees, and in alighting had probably sustained injury to the ovaries, and the yolks as they matured formed in a mass outside instead of dropping into the oviduct as in normal condition.

HAY SUBSTITUTES.

The following interesting article has been published by the Virginia Agricultural Experiment Station as a bulletin to farmers:—

In giving consideration to articles of food for cattle during the winter season, we are apt to expend more thought on the various grains and concentrated feeds than on the more bulky materials, commonly mentioned as roughage. This is but natural, as the former are much more expensive, but particularly because most farmers expect to raise enough of the coarse articles, and supplement with grains and mill feeds as may be necessary.

Occasionally, however, the question of economy in use of hay, corn stover, etc., forces itself upon us, and when this occurs, the best solution of the problem becomes of vital importance.

During the season of 1902, this vicinity was visited with a drought of unusual severity. About two-thirds the usual amount of corn was grown per acre, half of a wheat crop, while of hay we had perhaps a tenth the usual amount. When such drought prevails, stock of all kinds fail to increase in size or flesh, or to give the flow of milk that would be the case in ordinary seasons, but worse still, they go into winter quarters in bad condition, and with scanty feed of all kinds to carry them through. One may sell a portion of his stock, if he is so fortunate as to find a market, but as prices that must prevail would be very low, and, too, as the same cattle would probably be needed the following season, the tendency is to keep as many animals as can be kept alive, trusting to an open winter and good fortune rather than good feed to carry them through.

As we had but little hay, but more wheat straw and a very good amount of corn stover, and particularly as cotton seed hulls were being shipped into our immediate neighbourhood, it seemed a good time to study the values of these articles as "hay substitutes." We also had a good amount of silage, and the roughage mentioned above was given to the cows producing milk, while to a lot of fourteen spayed heifers the hay, straw, corn stover, and cotton seed hulls were given, as shown in a following table.

HAY SUBSTITUTES FOR DAIRY COWS.

For this work we selected fourteen cows of good constitution and size (most of them being Holstein grades), and with as nearly like conditions, concerning time of dropping last calf and date of becoming fresh again as circumstances would allow.

To these cattle we gave each a certain amount of silage—viz., 34 pounds per day. They also had 12 pounds of grain from a mixture as follows:—

10 parts of corn and cob meal.
4 parts bran.
4 parts cotton seed meal.
5 parts dark feeding flour (commonly called daisy middlings or red dog chop).
2 parts linseed meal (old process).

The above cost almost exactly one cent. per pound.

As will be noted, three of the cows were very poor milkers—Nos. 2, 9, and 13—but there was no reason to think they would fall off in flow more rapidly in proportion to amount given than the others, and they suited better for the work than balance that were available. These were the most common stock of the lot, and have since been slaughtered for beef.

The trial was continued for eleven weeks, and it would be natural, and it was expected, that in that time *all* animals would fall off somewhat in flow of milk, and the amount of such reduction would be an indication of relative value of food consumed. Besides the silage and grain given, each cow was allowed all the roughage she would consume, and of kinds as indicated in table.

Nos. 1 and 2, dry straw, mixed with the silage before feeding.
Nos. 3 and 4, dry corn stover.
Nos. 5 and 6, wet corn stover.
Nos. 7 and 8, dry straw (not mixed, as with 1 and 2).
Nos. 9 and 10, wet straw.
Nos. 11 and 12, dry hulls.
Nos. 13 and 14, wet hulls.

TABLE I.

No.	Yield Milk per week at beginning of experiment.	Yield Milk per week at close of experiment.	Gain * or Lost †	AVERAGE POUNDS CONSUMED PER WEEK.						
				Straw Mixed with Silage.	Dry Stover.	Wet Stover.	Dry Straw.	Wet Straw.	Dry Hulls.	Wet Hulls.
1	138·8	144·5	*5·7	104·2	...	...	...	...	...	...
2	97·8	69·6	†28·2	99·1	...	...	...	...	...	...
3	247·4	216·1	†31·3	...	100·2	...	...	...	...	...
4	185·4	195·6	*10·2	...	95·6	...	...	...	...	...
5	175·3	190·0	*14·7	...	...	93·6	...	...	...	...
6	185·7	188·6	*2·9	...	...	97·7	...	...	...	...
7	215·3	168·3	†47·0	...	...	...	53 3	...	...	...
8	204·0	142·5	†61·5	...	...	...	31·7	...	...	...
9	82·9	52·8	†30·1	...	...	...	...	20·0	...	...
10	135·6	134·4	†1·3	...	...	...	...	36·5	...	...
11	169·8	154·6	†15·2	...	...	...	...	...	28·7	...
12	222·3	173·8	†48·5	...	...	...	...	...	35·8	...
13	103·3	81·5	†21·8	...	...	...	...	...	...	93·4
14	158·3	99·7	†58·6	...	...	...	...	...	...	103·3

A portion of the cows were fed dry, and others wet, roughage, to see if the moisture would add to palatability and consequent greater consumption, and with resultant better yield of milk.

Cows given a moderate ration of grain and silage could not be expected to eat these coarse materials with any great relish, and if by any manipulation we can make them more palatable, we may use them to better advantage than would otherwise be possible.

If we consider first cows Nos. 3, 4, 5, and 6, the former pair given dry, and the latter wet stover, the amount consumed was slightly more with the cows given the dry article, if we judge by the averages as given in the table. In comparing the pairs, however, the table is not absolutely accurate. After the stover was once wet (and the same applies with equal force to the other articles), it is impossible to re-dry it and leave exactly the same amount of moisture it had before the wetting, hence any food that was left had to be weighed back as nearly correct as possible, but with an unavoidable element of error. Understanding this, the amount of stover consumed was practically the same in each case. Three out of four of these cows made a gain, rather than a loss in the flow, No. 3 alone giving a reduced yield by 31·3 pounds, as indicated by the dagger sign, and this becomes rather more of note, as only one other cow (No. 1) in the entire list made a gain in milk production. If we now glance at Nos. 7, 8, 9, and 10, the former pair given dry, and others wet wheat straw, we find again that more of the former than of the latter was eaten. Of the whole four, only one would eat as much as five pounds of straw per day, going without roughage (except the silage) rather than eat more of the kind offered. This being the case, it is not to be wondered at that each cow decreased in flow of milk.

When we turn to last lot of four animals, we find a condition very unlike the others seems to exist, but in reality the large amount of hulls eaten by Nos. 13 and 14 is not due alone to the moistened condition. After vainly attempting for two weeks to get the cows to eat the moistened hulls, we found it would be impossible to get them to consume any appreciable amount. We also found Nos. 11 and 12 did not relish them, at times leaving in the mangers almost the entire amount that had been given. For these reasons we not only moistened the hulls given Nos. 13 and 14, but we mixed with them a portion of their grain ration, the dry grain given them being reduced by the amount placed on the hulls. By this means they consumed over three times as many hulls as did the two preceding. To find the exact amount of these moistened and grain covered hulls that was consumed was extremely difficult, and utmost care was necessary that only such amount should be given as would be eaten.

Realising that wheat straw would not be relished by any of the cows, we concluded to not only moisten it for one lot, but to set aside a third pair, giving them straw mixed with their silage, and feeding it after it had been mixed for a short time, to give it a chance of getting the flavour of the silage. In this we were not disappointed, for both cows ate a very considerable amount of the straw, and the yield of milk was second only to the stover-fed lot. The straw could not be easily separated from the silage by the cow, and the whole was eaten with evident relish.

Noting the conditions under which these two cows seemed to thrive, we, in February, began feeding a considerable number in our herd (about twenty cows) with silage and straw mixed. Our method of handling it was: in the afternoon, just before dusk, we placed in a room convenient alternate layers of silage and cut straw. This was allowed to remain until next morning, when the whole mass would be quite warm and the straw soft. It was fed to the cows during the day, and another lot prepared. By this means we used a large amount of straw, and obviated the necessity of buying hay.

HAY SUBSTITUTES FOR WINTERING BEEF CATTLE.

Realising that many farmers would wish to see similar work carried out with beef cattle, we selected 14 spayed heifers, feeding them with articles of roughage as mentioned before, giving some of them a portion of hay, but no silage. We wanted to keep them in a thrifty condition, but did not aim to put on a large amount of flesh, therefore gave each eight pounds of a mixture similar to that given the cows, except without the middlings and linseed meal. Grain ration was same in all cases.

TABLE II.

No.	Weight at beginning of experiment.	Weight at close of experiment.	Gain, Pounds.	AVERAGE NUMBER OF POUNDS CONSUMED WEEKLY.			
				Hay.	Stover.	Straw.	Hulls.
1	1,034	1,055	21	91·2	...	...	...
2	1,000	1,108	108	90·6	...	...	...
3	954	1,020	66	...	83·2	...	...
4	934	1,059	125	...	80·3	...	...
5	910	917	7	...	...	31·2	...
6	904	944	40	...	...	31·6	...
7	919	1,040	121	...	...	...	58·5
8	930	962	32	...	...	...	51·5
9	950	1,010	60	41·6	34·2	...	...
10	826	904	78	48·4	40·5	...	...
11	827	844	17	48·9	...	17·2	...
12	830	906	76	46·4	...	18·3	...
13	818	830	12	44·5	...	...	30·1
14	826	...	...	...	...	...	...

As a basis of comparison, we gave Nos. 1 and 2 hay alone. Heifer No. 1 should be eliminated from the test, for, on account of not being accustomed to stalls in the barn, she constantly injured her knees, so much so, it was very evident it retarded gain in flesh, the others not suffering in like manner. We were also unfortunate with two others in the series, No. 14 receiving an injury by falling of such severe nature that she was taken out of the list early in the test period. The heifers were all bought as spayed animals, but toward the close of our work, it became very evident that No. 7 would soon drop a calf, and hence this one should not be considered in the list. With these exceptions, the cattle were all very thrifty and as uniform as a bunch of grade Shorthorns selected from 75 animals could well be. Looking at the gains of four animals first in order, we note the rather remarkable fact that the ones eating stover made a greater gain than the ones eating hay. Even if we leave out No. 1, as suggested, the stover-fed lot lose nothing by comparison, as the best of the latter lot made 17 pounds more gain than the better one of the hay-fed lot.

Proceeding with Nos. 5 and 6, we note that only a very small amount of straw was eaten, and the gains were relatively small, only seven pounds in one, and 40 pounds in the second case. If we eliminate No. 7, as we should, on account of being with calf, then the gains of the lot given hulls would seem but little better than the previous ones, even though they ate much more of the hulls than of the straw.

As we proceed with the balance of the cattle, we note nearly the same proportionate gains. The average of the two having hay and stover is considerably more than the next, which were given hay and straw, or of the last, given hay and hulls.

Summing up the work in both tests herein described, it would seem that we can draw some quite definite conclusions, at least for this section of the State, and with one or two modifications, for other portions of Virginia :

Corn stover can be used to excellent advantage as a roughage for beef animals, and with a moderate amount of grain, it compares very well with others given hay. For dairy cows, and when used with silage and a moderate grain ration it makes an admirable food. We have given a herd of dairy cows no roughage for the entire winter, except stover and silage, with grain as mentioned. The animals gave every appearance of thrift, and a good flow of milk continued.

At time of writing, and for a month and a-half previous, this has been the food given to our herd of over a hundred animals, and with most excellent results.

The use of straw cannot be so highly commended, and yet it can serve a good purpose, especially when hay is high in price. If given more grain to make up for the deficit in quality of the straw, it will carry stock safely through a winter, and even horses may do hard work, if given the best of care. Of course if one can get oat straw it is considerably better than that from wheat. For dairy cows, or in fact for stockers to be carried over, if they can have some silage and the straw mixed with it, as mentioned before, they are likely to come out in the spring in a very thrifty condition.

Of the cotton seed hulls we cannot speak very encouragingly, *for this section.* As one authority states, "they are in value about equal to oat straw." From our trial we should so consider them, though we were obliged to tempt the animals by every known means before they would eat them, due very likely to the fact they had never had access to them before.

It would seem as though it was unwise to ship such a roughage from the South where all coarse food is in demand, to this region where it is easily grown. We cannot hope to get them here for less than $7 to $7·50 per ton in car lots, and they are only of the value of oat straw ; that is too much to pay for them.

While mentioning cotton seed hulls, let us sound a word of caution concerning another product, at times sold as cotton feed—that is, cotton seed hulls with a slight amount of cotton seed meal mixed with them. The meal, of course, would add to the value of the hulls, but it affords so much opportunity for the maker or dealer to add greatly to selling price of the hulls, with addition of a very small amount of the meal, it is a very unsafe article to buy. To give a more definite turn to the argument, we have on hand, hulls that could probably be bought in small lots for not more than $9 per ton, and perhaps for less. These contain, according to analysis made by our chemical department, 4·19 per cent. protein. Some cotton feed (hulls and meal mixed), recently purchased near here at $14 per ton, contained only 4·63 per cent. of protein, or less than a half per cent. more than the hulls alone, but with a price $5 per ton higher.

We are also using some cotton seed meal that could be bought in car lot at $26 per ton, and this contains over 46 per cent. of protein. Compare this with the so-called cotton feed, and one can see at a glance which is the cheaper food to buy. In portions of Virginia, where freight rates are low, it may be possible to use hulls to advantage, but rather than buy the mixed hulls and meal, it is far better to buy each separate and mix in proportions and as wanted.

In seasons such as the one just passed, when the rainfall is so small in the early spring as to seriously cut off the hay crop, we often look about for some plant to sow to supplement the small hay harvest. Millets are often sown, and with excellent results, but corn may be planted later than is usually considered wise, and yet get a valuable crop. This season we had almost no rain until last days of June. As soon as the soil was moist enough to plow, we turned a piece of turf (after cutting a very poor hay crop), ordered it, put on 200 pounds per acre of 16 per cent. acid phosphate, and planted to corn, finishing on July 3rd. A portion of the field was planted with a very small variety, known as Pride of the North, and the balance with the larger and yet rather early Leaming. The stalks of the former were small, hardly larger than one's thumbs, full of leaves, and in September before frost came the ears were well in the milk state. The Leaming was nearly as far advanced in the ear, but the stalk was much larger, and did not cure as thoroughly after cutting. To cure it, we cut with a corn harvester, dropping the bundles separately, and allowed to lay for three or four days and then shocking. This was used during last day of December and first of January, and was much relished by all stock. We obtained from the small variety a yield of 4,220 pounds per acre, and of the larger variety 3,860 pounds per acre, the former having been planted somewhat thicker to make up for small size of plant. Considering the late date of planting, the crop was a good one, and makes a very satisfactory "hay substitute," and, while costing far less per ton than the cotton seed hulls, was worth much more to us.

SHOOTING FRUIT-EATING BIRDS.

In a short time fruit-growers will have to face their annual trouble, the numerous fruit-eating birds. As shooting seems to be the only effectual way to deal with them, I should like to make a few remarks on this subject. I wish to point out how the expense of this work may be considerably reduced, and to describe an all-round and general-utility gun that would fulfil all the various requirements of fruit-growers, say from flying-foxes to silver-eyes.

I could never realise how it is that people have such a predilection for the 12-bore gun; unless at a pigeon match I have always thought it out of place. A much smaller-bore gun would do all the work an orchardist demands. The gun I propose is a 16-bore double barrel, full choked in both barrels, 30 inches long, chambered for Eley's solid-drawn brass cartridges—breech-loading, of course. The breech-loading gun is so easily cleaned and unloaded, and possesses so many advantages over the muzzle-loader, that we may consider the latter weapon obsolete.

The advantage of the solid-drawn brass cartridge is its cheapness in comparison with the ordinary paper cases. It can be bought retail in Sydney for 1½d. each; it will stand loading and discharging over 100 times with any charge that can be got into it. The best paper cases on an average will not stand more than three charges. As no gas can possibly escape to the rear of the brass case, stronger shooting is assured, together with a better pattern and superior penetration.

The following loads may be used with as good results as can be got by using them in various guns, each gun specially built for one load only:—

For silver-eyes ...	⅜ oz.	Placet shot,	1½	drams powder,	up to	25 yards.
„ sparrows ...	½ „	No. 10 „	1¾	„	„	30 „
„ parrots ...	¾ „	No. 8 „	2¼	„	„	35 „
„ flying-foxes ...	1 „	No. 6 „	2¾	„	„	40 „
„ do. ...	1⅛ „	No. 4 „	3	„	„	60 „

I have used these loads for many years, and never yet have I seen anyone do better with their big guns and heavy loads. It has always seemed to me, when I have observed people using a 12-bore gun and full-loaded cases to kill silver-eyes, that the result did not justify the outlay. Wads made for 16-gauge paper cases fit 20-gauge brass cases; no crimping of the case is required. In guns built on this system the bore of barrel is so slightly less than the chamber that there is an entire absence of kick so prevalent in guns built for paper cases. With a gun of this description I have fired hundreds of times per day in a flying-fox camp, with only a flannel singlet between shoulder and gun-stock, without the slightest jar or bruise.

To use these brass cases to advantage the gun must be specially built for them. If some Sydney firm would stock guns of this description I am sure a ready sale would be found.

It would give me pleasure to impart any information I have to further this end. A good serviceable and safe gun, with loading and cleaning implements, could be sold for £4 10s., and, according to grade, up to £7. Curtis and Hearvy's Austral powder is good and cheap, 2s. per lb.; for orchard work I use no other. Best sporting powder is double the price and no better for the purpose.—*Exchange.*

SLEEPY DISEASE OF TOMATOES

(Fusarium lycopersici).

DESCRIPTION AND APPEARANCE OF PLANTS ATTACKED.

The "Sleepy Disease" of tomatoes, although known for some seasons in Great Britain, has acquired an increased importance among growers, owing to the extended cultivation of the plant in recent years.

The plant may be diseased inside when quite young, but the outward manifestations do not necessarily appear at once. The first indication that the tomato is affected is shown in the drooping of the leaves and their bad colour. If the root is split, the woody portion is seen to be of a dingy yellowish brown colour, which becomes more marked if left open for half-a-day. When the plant has been attacked about three weeks, the lower portion of the stem is usually covered with a delicate white bloom of mildew. Eventually the stem is covered with patches of a dull orange colour, and becomes very much decayed. The disease can always be identified by a brownish ring just within the bark at the base of the stem or thicker branches of the root.

The disease is due to a fungus which flourishes in the soil and enters the plant by the root. During its development it passes through three stages, the first of which usually lasts about a week, the stem at the end of that time being much decayed and covered with a gelatinous mass. During the last stage the spores are resting and preparing to attack the young plants another year, or whenever a suitable opportunity presents itself. The plant can only be attacked by the fungus in the last stage of its existence.

TREATMENT.

1. It must be remembered in the first place that diseased plants never recover, and therefore no attempt to save the plant is successful.

2. As the disease grows inside the plant it is useless to spray with a fungicide.

3. As the resting spores of the fungus live and thrive in the earth, and attack the plant through the root, the disease must be attacked in that quarter.

It is therefore recommended that:—

(1.) All diseased plants should be uprooted immediately the disease is noticed, and should be burned.

(2.) The soil in which the plants grew should be removed and sterilised by heat, or mixed with a liberal allowance of quicklime.

(3.) If the disease appears in a glasshouse, every part of the house should be washed with a solution of carbolic acid and water (1 of the acid to 20 parts of water) after the soil has been removed.

(4.) If it is not practicable to remove the soil, it should receive a liberal dressing of gas-lime. This should be allowed to lie on the surface for ten days, and should afterwards be thoroughly incorporated with the soil. After this the soil should remain for at least ten weeks before anything is planted in it. It should be soaked with water once a week.

(5.) As much lime as the plants will allow should be mixed with the soil in which tomatoes are grown, more especially if they are grown in the same beds during successive seasons.

(6.) The infected soil from a bed should not be thrown out at random, but should be sterilised by an admixture of quicklime, and care should be taken not to bring it in contact with tomato beds.

(7.) Only short-jointed sturdy plants should be used, and those should be fairly hard, and the foliage of a dark bronze appearance. All spindly or drawn plants should be rejected.

(8.) The plants should be allowed plenty of air, light, and room for growth.

—Board of Agriculture leaflet, No. 116.

FACTORS FOR SUCCESS ON THE FARM.

THE FACTOR MOST ESSENTIAL TO THE SUCCESS OF THE FARMER, HOW SECURED, AND HOW RETAINED.

(A Paper read by R. CALDWELL, Chairman Onkaparinga Butter and Cheese Co-operative Company, at the Conference of the Hills Branches of Agricultural Bureaux.)

The subject of my address is no less important than peculiar. Many congresses and conferences of bureaux have been held, but I am not aware that attention has yet been given to the question that I purpose bringing before your notice. I am well aware of the fact that different people hold different opinions regarding what is most essential to the success of the farmer. Judging by the results that have attended the use of phosphatic manure, many will doubtless hold the opinion that if the prosperity of the farmer is due to one thing more than another it is the manure that has enabled him, for the time being, to double the average yield of his land.

NOT MANURE OR CULTIVATION.

Others will say artificial manure serves a good purpose, but unless the land is properly fallowed and pulverised the manure will be of little benefit. The secret of success consists in working the land properly at the proper time, hence the plough and the cultivator are the most important factors in the success of the farmer. Others say manure as you like and cultivate ever so carefully, unless you have the proper varieties of grain you can never be sure of a crop. These maintain that "Marshall's No. 3," "Majestic," "Comeback," "King's Early," "Gluyas," or "John Brown" are the most essential factors.

NOT MACHINERY.

Of course, others challenge this verdict, and assert that the article most essential to the success of the farmer is "the Complete Harvester." They say you can make use of the best manure, cultivate with the greatest care possible, and sow only the best varieties of disease-resisting grain, which may yield 30 bushels to the acre, unless you have a machine that will gather it quickly, success is a very uncertain quantity; hence the Complete Harvester is the most essential factor.

NOT HORSES.

Others again say this is all very well, but you are still dependent on power. The Complete harvester and the plough and cultivator are useless unless you have a good team of serviceable horses. So, after all, a well-bred draught horse is the most essential factor on the farm.

NOT THE COW OR THE PIG.

Others will have it that a dairy cow of a good milking strain is the factor that will command success, taking everything into account; and a young woman that I mentioned the subject of my address to a few days ago remarked:—"I suppose the pig is considered by some people to be one of the most important factors on the farm." She had doubtless heard the story of the Irishman, who, on being remonstrated with for having a large porker in his house, remarked:—"Shure and isn't he the man of the house; and isn't it he who will pay the rint?"

NOT POULTRY.

Not a few faddists have an idea that, as it is not well to place too much trust in wheat, horses, cattle, or pigs, poultry should not be overlooked. These realise the importance of the egg-laying competitions that are now being held in our own and other States; and whether the White Leghorn or the Wyandotte will carry off the prize, they are reasonably certain that the hen is the factor that is most essential to success.

Such are the opinions of some who are fain to consider themselves authorities respecting the factor that is most essential to the success of the farmer.

THE FACTOR FOUND.

While admitting that they have cause for their preferences, I say at once that I cannot agree with them. Neither do I agree with those who assert that success depends entirely on the punctuality, diligence, intelligence, and physical endurance of the farmer. Of course, I am not foolish enough to think that great importance does not attach to such qualifications. I go further and say that success is almost impossible without them, for you cannot get the best result from the soil, the implements, the manure, the seed, the harvester, the horse, the cow, the pig, and the hen, without the qualifications that I have just named. And while I repeat what I have already stated, that their importance can scarcely be over-estimated, the factor most essential to the success of the farmer has yet to be named. Without a regulator our watches are of little service; without a regulator the stronger the engine the greater the amount of dissatisfaction and danger. Without a regulator it is impossible to obtain the best results from either horse or machine; and so, without a regulator, even the man who is endowed with diligence, intelligence, and physical endurance is scarcely likely to reach the success that is commonly allowed to be possible.

WOMAN—LOVELY WOMAN.

I therefore place the regulator of the home—the woman, the wife, the mother, the daughter, the sister—on the top of the list as being the factor that is most essential to the success of the farmer. And this estimate I do not make without due consideration. But let it be clearly understood that the factor that I am now referring to is not the woman who—to use a vulgar expression—"bosses the show;" who takes the management of affairs out of the hands of the farmer, but the woman who operates with him and through him, feeds him, keeps him in good humour, gives him encouragement, makes him a willing worker, a hero, not a drudge or a slave, and so manages the affairs of her household that everything within doors and without proceeds with that harmony and regularity that is indispensable to success, whether in heaven or on earth.

WHAT A WOMAN CAN DO.

There are such women—they may not be very common—but in ninety-nine cases out of the hundred you will not meet with a successful man on the farm (or I might almost say anywhere else) unless he has had the assistance of such a regulator. Most of the failures in life are due to the absence of such women, and I can scarcely recall a single instance where a farmer has been successful who has not been blest with the co-operation of such a woman. I am not now reporting a discovery. I am only giving prominence to a most important fact that has been overlooked by writers in newspapers and journals of agriculture, who give "hints" and what they consider "instruction to farmers." The following observations were made respecting such a regulator nearly 3,000 years ago.

> "Her price is above rubies;
> The heart of her husband doth safely trust in her,
> So that he shall have no need to sport,
> She will do him good and not evil all the days of his life.
>
> . . . .
>
> She riseth also while it is yet night,
> And giveth meat to her household,
> And a portion to her maidens.
>
> . . . .
>
> Her husband is known in the gates
> When he sitteth among the elders of the land."

WOMAN, QUEEN.

Time will not permit of me quoting more from the old writer's estimate of the qualities of the woman whose value "is above rubies." In brief, the justification of the appreciation is simply this—the women is queen of the home, while the man is the hero king of the field and farm, and, according to the estimate just given, she manages her affairs so wisely and well that her husband has "no need of sport" or to go hunting beyond the limits of his own domain. "The heart of her husband doth safely trust in her"—that is to say, he has confidence in his wife's arrangements. She is the timekeeper and regulator of the home and household.

REGULARITY.

To succeed in any line of business or industry regularity is an absolute necessity, and nowhere is this more evident and more pressing than on the farm.

SHARE THE WORK.

It must not be inferred that the wife or housekeeper is to release the husband from all responsibility. To rouse the assistants to their respective duties, the watering and feeding of horses, and such like, perhaps even the kindling of the fire in the kitchen—certainly the providing of an adequate supply of firewood—should form part of the farmer's obligation. But the preparation and regulation of meals are under the exclusive control of the wife or housekeeper.

FEEDING THE FAMILY.

The food provided must not only be of high standard quality, it must be supplied with absolute regularity. Under ordinary circumstances there should not be a variation of more than five minutes in the stated times for meals, especially the first meal of the day. The plough, the cultivator, the mower, and the harvester must be kept going, and as a first consideration to secure this, meals must be regularly provided. The workman must be kept in good heart. Hence the housekeeper practically says to the farmer, "I will see to the appointments of the home. You attend to the duties of the farm. You cultivate, harvest, and market the produce to the greatest advantage.

I WILL TAKE GOOD CARE OF THE EARNINGS.

I will see that nothing is wasted." Such women are not so scarce as many consider them to be. You will find, at least, one in every successful and properly-equipped household. I do not say that success is impossible without the woman.

EXCEPTIONS PROVE THE RULE.

Not a few young men, and good-hearted old bachelors, who have conscientious reasons to give why they did not take unto themselves wives, and who love land, and horses, and cattle, and sheep, and machinery, and work, have done very well upon farms, but if a true statement of their success could be made, it would perhaps be seen that the influence of the woman was operating, not perhaps in the case of the kind-hearted old bachelors, but in the case of the successful young men. A wise poet thus refers to the reason for the progress of one who was toiling in hope:—

"Ever of her he thought when he fashioned the walls of his dwelling;
Ever of her he thought when he delved in the soil of his garden."

And so he went along "led by illusions romantic and subtle deceptions of fancy."

But more under this head need not be said, and I have left out many an important duty that has been delegated to the queen of home—the dairy—and attention to the poultry kept, the gathering of eggs, etc., etc. I absolve the housekeeper from any part or portion of the work involved by the keeping of swine.

There are many grand women available for all the purposes of life. How are they to be obtained, and how maintained? Dryden in his celebrated ode exclaims:—

> "None but the brave! None but the brave, deserve the fair!"

And we can say with assurance that only the industrious, intelligent, and determined young man deserves to secure the co-operation of a woman that will help him overcome those difficulties that always stand in the way of progress. Should such meet, they ought to lose no time in arranging for the service of mother Church to bless them in their desire to promote the well-being of each other.

So far as nationality is concerned, you will find the right sort of woman in all nationalities. There are many good and industrious English women; the Scotch women are proverbially so; and in our own district I have met with not a few German women who could hold their own against women of any nationality—women well qualified to take charge of schools, nay, even colleges of industry—women calculated to do their husbands "good and not evil all the days of their life."

HOW ARE THEY TO BE OBTAINED?

By young men making honourable overtures to them, giving them some evidence that they are actuated by a desire to rise in life, to become heroes not in sports and pastimes, but in those manly avocations that, in the first place, lead to the establishment of the home, and, in the second, to the prosperity and happiness of the community. Thus only are those queenly-dispositioned women (whose value is above rubies) to be obtained.

AND HOW ARE THEY TO BE RETAINED?

Ah! that is a more serious question. It is noted that the queenly-dispositioned women above referred to have a tendency to make slaves of themselves in the interests of their husbands and families when they are blessed with children. The old author that I have already quoted, speaking about the typical woman, says:—

> "She worketh willingly with her hands,
> Her candle goeth not out by night;
> She layeth her hands to the spindle,
> And her hands hold the distaff;
> She looketh well to the ways of her household;
> Her children arise up and call her blessed,
> Her husband also, and he praiseth her."

Which means that she is always spending herself in the service of others, and it is often the case that the very praise she deservedly receives from her husband and children acts as a stimulant, and causes her to overtax her strength—in burning the midnight candle while making and mending, and in rising a long time before the sun to prepare for the duties of the day, thus impairing her energy and causing her to become old before the time, and often causing her "to fall and perish, weary with the march of life."

Such experiences are by no means uncommon, particularly on farms where the cultivators have been remarkably successful.

How are such consequences to be avoided? By making these invaluable helpers the subject of greater consideration, by dealing more kindly by them, in relieving their cares and lightening their burdens, for, whether we acknowledge it or not, the good and industrious woman is the factor that is most essential to the success of the farmer, and the longer her service is retained the better will it be for all concerned.

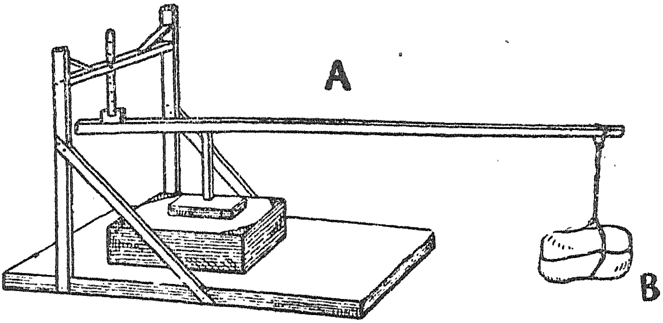
CHEESE-MAKING ON THE FARM.

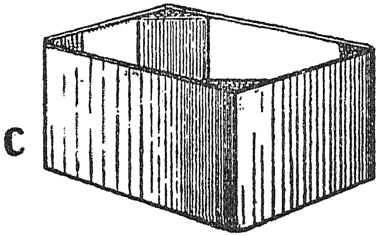
A very serviceable and satisfactory cheese press is shown by the drawing. Very little explanation is needed. The bottom pieces may conveniently be a wide plank, the standards 2in. x 4in. wood of almost any kind that is tough and strong, the cross piece between the standards needs to be a tough, strong piece so as to bear the leverage. The part with the holes in is best of iron. This is adjusted by an iron pin to suit. The lever is weighed by a large stone. The cheese hoop, which is shown in the next cut with its follower, is placed on the bottom plank. A square block of wood in which a short post is inserted, is placed over the follower and makes the fulcrum for the lever.

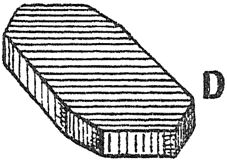
The cheese mould or hoop shown is of octagon shape and made of inch boards; the corner pieces are shaped triangular to form the octagon. The follower is sawed from a two-inch plank to fit the hoop easily. It may be made of any size required. It is best made deep and narrow so as to press out a cheese of good depth. A thin, flat cheese is a poor shape.

Skim milk containing 1 to 2 per cent. butter fat is dear feed for hogs or calves. Such milk will make good cheese, and the whey, fed fresh and warm, will make a capital food for the hogs. When the milk is raised on the farm, and cream raised by gravity process, the skim milk, in nine cases out of ten, as farm conditions appear to be, will test from 1 to 2 per cent. butter fat. The skim milk being so rich in fat is why farmers' wives so frequently make good cheese from skim milk.

I would never advise making cheese from whole milk on the farm. The stuff is too valuable for the average housewife to manipulate. We know some who are trying to make cheese from whole milk but are not meeting with success, so don't begin to make cheese from whole milk on the kitchen stove. You simply cannot make the first-class article of Cheddar as turned out in the factories where conditions are right and the maker usually an experienced hand. The farm home conditions are seldom adapted to the making of cheese from whole milk. Because if the article is not first-class, it will not bring the price of factory-made cheese, and then the milk is manipulated at a loss.







In the care of skim milk cheese the case is different. Skim milk is usually a waste product on the farm, and when the skim milk is from gravity process it is too valuable a product to form a waste article. Skim milk containing 1 to 2 per cent. fat is too valuable to be called waste, too valuable to be fed to hogs. It is this kind of milk that may be made into cheese, with advantage and profit, on the farm. Milk containing 1 to 2 per cent. butter fat will make first-rate cheese for home use, and occasionally there is a market for this kind of cheese at a few pence below the price of the whole milk factory cheese. The writer has made lots of cheese from milk such as this and the drawings herewith are for such cheese-making.

A dairy thermometer, rennet, colouring, and cheese-cloth are all the extra utensils needed to make good cheese on the farm. With ordinary gravity process 100lbs. skim milk will make 7 to $7\frac{1}{2}$lbs. cheese. If the boiler does not hold 100lbs. milk, curd what milk it holds, and keep the curd till enough is obtained for a cheese. Fill the boiler with milk and place on the stove. Put the thermometer in the milk and slowly heat to 86 deg. Now add two teaspoonfuls of rennet extract with water, about a half-cupful, before adding to the milk. At the same time add a teaspoonful of colouring. Let the milk come to 90 deg., take off the stove and cover with a cloth; in 15 or 20 minutes it should be sufficiently coagulated. When so, lift on the stove again, and with a table knife cut the curd in all directions so as to put it into small cubes, heat slowly to 100 degrees, stirring occasionally to prevent the curd settling to the bottom and burning or over-heating.

It is cooked enough when a handful of curd, upon being tightly squeezed, until all the whey is out, will fall apart easily. Now take off the stove again and cover as before, allowing the curd to lie in the whey for a time. It is now ready to dip. Lift the curd into a sink and allow to drain. In the sink it is worked over to work out the whey. It is then ground up quite fine with the hands and salted at the rate of about 6oz. salt to 100lbs. milk, and well worked. Let it then lie for awhile before putting it into the hoop. Curd is best put into the hoop at about 70 degrees. If there is not enough curd, as is frequently the case on a farm, to fill the hoop, put it away, where the temperature is about 60 degrees, and it will be all right till next day. This is better than keeping the milk from day to day till there is enough to make a cheese, and is the way followed in the Cheddar cheese factories. The previous day's curd may be mixed with the curd of the next day's milk and placed in the hoop.

After being in the press two hours, the cheese should be turned upside down, the cloths fixed nicely, and the pressure is added as before; leave in the press for two days; have the cheese well bandaged when put away to cure. A temperature of 60 to 70 degrees is best for curing the cheese, where it should be kept for three weeks and turned daily.—*Hoard's Dairyman.*

INOCULATING THE GROUND: A REMARKABLE DISCOVERY IN SCIENTIFIC AGRICULTURE.*

By GILBERT H. GROSVENOR.

"Did you vaccinate your land this year?" was the startling question I heard one farmer ask another the other day. "Well, I I guess," he replied. "You remember that corner field which I gave up as hopeless last year. Well, when I heard about the yeast cake the government was giving free with the promise that they'd make clover or alfalfa grow where we farmers couldn't raise anything but weeds, and thin weeds at that, I thought I'd send for several of the cakes. When the cakes came, I vaccinated the field according to instructions, planting it in alfalfa. I tell you,

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* The *Century Magazine*, October, 1904.

I've had three whopping crops, and I've got off that formerly worthless field five times more than I've been getting off my best land, and I've got some pretty good land too."

We have grown accustomed to the idea of being vaccinated. Some of our most dread diseases have been vanquished or checked by inoculation—small-pox, diphtheria, rabies, and we hope the plague—but to cure sterile ground and make it bring forth fruit in abundance by inoculation is something so strange and revolutionary that we should not believe the statement were it not for convincing and irrefutable facts.

Before explaining the discovery and manner of this extraordinary process of agricultural science, it might be well to review a few well-known facts in the life of plants.

One of the most important elements of the food of a plant is nitrogen, which it absorbs from the soil mainly through its roots; successive crops of grain soon drain the soil of its plant-food, and in process of time makes the richest land poor and worthless.

A good farmer partly balances the drain on his soil by using plentiful quantities of manure and fertiliser, and thus puts back much of the nitrogen which his crops remove.

We send to Chile, thousands of miles away, for help, and at much expense import from her thousands of tons of costly nitrate, though we have all about us—in the air we breathe—exhaustless stores of fertiliser. Free nitrogen forms seven-tenths of the atmosphere. If we could tap and use this sea of nitrogen, we could fertilise the whole earth and keep it rich; but it has been of no use to us hitherto, because we have had no means of capturing it and of putting it into the ground. Its simplicity has baffled us. Like the plenty that tormented Tantalus, it has ever eluded our grasp.

We are taking the nitrogen from the soil so much faster than we can put it back that some persons have predicted a "nitrogen famine" at no distant day, and have luridly described the horrors that will fall upon us when the soil becomes so poverty-stricken that our crops of wheat and grain and rice will fail to feed the nations. While this view is of course partly imaginative, and exaggerates the nearness of the danger, the fact remains that many areas in England and Europe and the eastern United States, formerly fertile, are now unproductive because the nitrogen in the soil has been exhausted.

But now man has captured a tiny germ invisible to the naked eye, which can take from the boundless store of nitrogen he has coveted and put it into the earth for him.

Ever since the time of Pliny, farmers have noticed that after a crop of peas, alfalfa or any of the leguminous plants, a heavier yield of wheat can be obtained; thus has arisen the old profitable rule of rotation of crops.

But the reason certain plants enrich the ground while others exhaust it, remained a mystery until an inquiring German discovered some years ago that peas, beans, etc., obtained their nitrogen food not from the nitrates in the soil, but from the free supply of the air. He also discovered that these plants absorb much more nitrogen than they could use, and left the surplus in the soil. That is, beans, peas, alfalfa, clover, put back into the mother earth what corn and wheat and grain remove. The manner in which they do this is unique, and another instance of the marvellous and mysterious laws by which the balance of Nature is maintained.

If one digs up a healthy bean or clover plant and examines the roots, he will see a number of rounded bulbs, called nodules or tubercle, on the roots. At first sight he might imagine that the plant had a lot of sores over it, that it was diseased, or had been bitten by worms or insects. All legumes have these nodules or tubercles, varying in size from a pinhead to clusters as large as a good-sized potato. Scientists noticed that plants with good-sized nodules flourished, while plants without nodules or with very small ones looked starved and withered, and they concluded that the nodules must have something to do with the vigour of the plants. On dissecting a bulb and examining it under a microscope, it was found to be packed with bacteria. Further examination showed that it, and all nodules, consist of millions of bacteria and that these bacteria were incessantly absorbing free nitrogen from the air and converting it into forms suitable for the plant's digestion.

For want of a better term we will call the germs nitrogen-fixing bacteria.

Careful examination of the earth showed that all soil where legumes grow contain these nitrogen-fixing bacteria in greater or less quantities; that these organisms settle on the plants and form the colonies or tubercles on the roots. If the soil contain none of these organisms to settle on the roots, the legumes will not grow at all. Each tubercle acts as a feeder to the plant. The more numerous and larger the tubercles, the more prosperous is the plant. One might thus define a tubercle as a little factory where millions of tireless infinitesimal workers are separating the nitrogen in the air and converting it into plant food. A celebrated German, Professor Nobbe, of Tharandt, realised that if he could put into barren ground some of these organisms, or if he could artificially present the seeds with power to develop tubercles of themselves he could make legumes grow in the most hopeless soils.

After much labour he isolated the nitrogen-fixing bacteria. He succeeded in breeding and colonising the germs, and then proceeded to put them on the market. He advertised them widely as able to make legumes grow in the poorest soil. Naturally the announcement made a great sensation, and farmers from all quarters of the globe wrote him for sample bacteria. He sold different preparations for different crops, putting them up in bottles and calling them *Nitragin*. But the bacteria did not work the miracles promised. Seeds inoculated with them failed to develop tubercles. A few persons, to be sure, obtained wonderful results, but the vast majority of cases were complete failures. The bacteria burned themselves out and disappeared without producing a single nodule on the plants. They lacked permanence. The nitragin was withdrawn from the market.

These two men had done a great service to mankind; one had solved the problem of why certain plants enriched instead of drained the soil—he had isolated the microscopic agents, the myriads of organisms which would carry back to mother earth what others had stolen; the other had shown that man could breed as many of these little helpers as he desired, but he had not been able to give them permanence, so that men could get service from them.

At this point the inventive genius of an American, Dr. George T. Moore, came to the rescue, and saved the discovery by giving it just the practical value it had lacked. Dr. Moore is in charge of the Laboratory of Plant Physiology of the Department of Agriculture, and a widely-known practical botanist. He had been watching Dr. Nobbe's experiments and had come to the conclusion that Dr. Nobbe did not cultivate his nitrogen-fixing bacteria in the right way. The German's method of rearing his germ colonies resembled that of a rich father who gives his son everything he asks for without making him work for anything. As a result, when the youth is thrown on his own resources, he proves unable to earn his own living, and collapses. Similarly, Dr. Nobbe, instead of developing the natural inclination and ability of his bacteria to hunt out nitrogen for themselves, dulled and destroyed this ability by giving them large quantities of nitrogen food, in what we might call predigested form; he so satiated them with nitrogen that they lost their ability to hunt for it themselves, and when turned out of the laboratory were helpless. They soon consumed the store of nitrogen which they had received, but could not by themselves get any more. The nitrogen-fixing ability was gone and they perished.

Dr. Moore decided not to dull the appetite of the nitrogen-fixing bacteria by giving them all the nitrogen they wanted; he thought he would whet their appetite, he would strengthen their nitrogen-fixing power, by exercise, by giving them in their food just enough nitrogen to make them want more and to make them strive to get more by their own efforts. By following this principle of feeding he developed a permanent type of bacteria in his laboratory possessing five or ten times more power to fix free nitrogen than the original germs had possessed. The bacteria had gained strength, vigour, and self-reliance, and when turned out of the laboratory, prospered like all healthy bacteria. Legumes inoculated with the bacteria developed great tubercles and grew to great size even in the poorest soil.

The nitrogen-fixing power of the bacteria developed by Dr. Moore is so extraordinary that seeds soaked in the solution will sprout and produce luxurious plants in quartz sand which has been previously ignited to a red heat in order to drive out all nitrates.

Having secured a type of bacteria the nitrogen-fixing power of which was permanent, the next step was to obtain a simple means of distributing them to persons who desired to inoculate their land. Experiments showed that bacteria when grown upon nitrogen-free media will retain their high activity for a long time if carefully dried out and revived in a liquid medium. Dr. Moore also discovered that by using some absorbent, like cotton, a small piece of which will soak up millions of the organisms, and then by allowing these cultures to become dry, the bacteria can be sent to any part of the world and yet arrive in perfect condition.

Naturally Dr. Moore patented his discovery, but then he did a very unusual thing—he deeded the patent to the Department of Agriculture, in trust for the American people. To be sure, his discovery had been made in the Government laboratories, but the Government, neither morally nor legally, could claim any share in the discovery. It was indisputably his. Dr. Moore gave the patent to the people in order that all might have the free use of it. Doubtless he could have made a generous fortune if he had formed a company and exploited the patent, as the German company made a good profit from their unreliable nitragin, which they sold at a dollar a bottle. A simple method of distributing the germs that bring fertility having thus been found, the announcement was made that the Department of Agriculture was prepared to send applicants, free of charge, enough inoculating material for several acres.

A portion of inoculating material as it is mailed to the farm by the Government consists of three different packages. Package No. 2 contains the cotton with its millions of dried germs. Packages 1 and 3 are the media of food by means of which the farmer can multiply the germs. The department incloses explicit instructions how to use the bacteria, as follows:—

DIRECTIONS FOR USING INOCULATING MATERIAL.

(Method patented in order to guarantee the privilege of use by the public. Letters Patent No. 755,519, granted 22nd March, 1904.)

Put one gallon of clean water (preferably rainwater) in a clean tub or bucket and add No. 1 of the inclosed package of salts (containing granulated sugar, potassium phosphate, and magnesium sulphate.) Stir occasionally until it is all dissolved.

Carefully open package No. 2 (containing bacteria) and drop the inclosed cotton into the solution. Cover the tub with a paper to protect from dust, and set aside in a warm place for twenty-four hours. Do not heat the solution or you will kill the bacteria—it should never be warmer than blood-heat.

After twenty-four hours add the contents of package No. 3 (containing ammonium phosphate). Within twenty hours more the solution will have a cloudy appearance and is ready for use.

To Inoculate Seed.—Take just enough of the solution to thoroughly moisten the seed. Stir thoroughly so that all the seeds are touched by the solution. Spread out the seeds in a shady place until they are perfectly dry, and plant at the usual time just as you would untreated seed. The dry cultures as sent from the laboratory will keep for several months. Do not prepare the liquid culture more than two or three days previous to the time when the seeds are to be treated, as the solution once made up must usually be used at the end of forty-eight hours.

To Inoculate Soils.—Take enough dry earth so that the solution will merely moisten it. Mix thoroughly, so that all the particles of soil are moistened. Thoroughly mix this earth with four or five times as much, say, half a wagon load. Spread this inoculated soil thinly and evenly over the field exactly as if spreading fertiliser. This should be done just before ploughing, or else the inoculated soil should be harrowed in immediately.

Either of the above methods may be used, as may be most convenient.

Enough germs are sent in each little package to inoculate seeds for from one to four acres. The package can be carried in your pocket, and yet does more work than several cart loads of fertiliser. It costs the government less than four cents a cake, or less than a cent. an acre, and saves the farmer thirty or forty dollars, which he would have to spend for an equal amount of fertiliser. Different cultures are sent for different crops.

The results have been surprising. If Malthus were living, he would have to revise his calculations of the time when the world will be so crammed with people that it cannot feed them.

A comparison of the actual figures of yield of two crops grown on exactly the same land, but one of inoculated and the other of uninoculated seeds is quite startling. Two patches of hairy vetch grown side by side under precisely the same conditions, yielded crops as follows: Uninoculated patch, 581 pounds; inoculated patch, 4,501 pounds, an increase of more than eight times. Crimson clover under similar conditions yielded: Uninoculated, 372 pounds; inoculated 6,292 pounds—an increase of nearly twenty times.

It does not require a trained scientist to apply the cultures. The results obtained by any intelligent farmer are as wonderful as these.

For instance, take the case of a Maryland farmer who had formerly been able to cultivate only one-third of his land; he had been obliged to abandon two-thirds because of the hopelessness of getting anything from it. Now, at no expense to himself and at trivial amount of labour, he had reclaimed the worthless two-thirds and made it more productive than the other third. He had increased the yield of his farm, his income, fivefold; a generous living is now before him.

And what did it cost the government to help him so generously? Eight cents! The farmer had used two cakes to inoculate the seeds for seven acres, each cake costing the government four cents to manufacture.

But there are even other wonders that these little nitrogen-fixing bacteria work. It has already been explained how legumes enrich the soil by bringing back nitrogen to it. The same bacteria that increase the harvest of beans or clover or alfalfa tenfold enable the plants to leave many times more nitrogen in the soil than they would have done if uninoculated; in other words, they make the soil many times more fertile, so that the crop of cotton or wheat or corn or potatoes planted next year is many times larger. Thus the rotating crop the year following inoculation derives an equal benefit from the inoculation. For instance, a crop of crimson clover, not inoculated, added to one acre of land 4·3 pounds of nitrogen; a crop of crimson clover, inoculated, added to one acre of precisely similar land 143·7 pounds of nitrogen, an increase of 33½ times; a crop of inoculated hairy vetch added to one acre 15 times more nitrogen than a crop of uninoculated hairy vetch.

Cotton planted after an inoculated crop of red clover gave an increased yield of 40 per cent. Potatoes, after an inoculated crop, yielded an increase of 50 per cent. The wheat crop increased by 46 per cent., the oats 300 per cent., and the rye 400 per cent. The table below shows the effect of inoculated legumes on various crops.

The germs can be used in any climate. It must be clearly understood, however, that only leguminous plants—beans, clover, alfala, peas lupin, vetch, etc.—are directly benefited by the nitrogen-fixing bacteria. Where the soil is rich in nitrates, the crop is not appreciably increased by the use of the inoculating bacteria; but where the soil is poor, the harvest is increased many times.

There is not a section of the United States which will not profit by Dr. Moore's discovery. Nearly every State has its wornout farming land, bringing despair to the economist who laments our careless handling of the fields and who wonders how the country will support the hundreds of millions soon to be ours. The bacteria means intensive cultivation with a vengeance, and should give him hope. It is impossible as yet to calculate by how much they will enhance the yield of our crops and of the world's crops, but the results already achieved prove that in time the gain will be enormous.

	Original yield per acre.	Yield per acre after inoculated crop.	Gain in weight.	Gain in value.	Per cent. of gain.
					per cent.
Cotton ...	932· pounds	After red clover, 1,304 pounds	372· pounds	$44·64	40
Potatoes	67·8 bush'ls	After crimson clover, 102·2 bushels	34·4 bush'ls	15·	50
Oats ...	8·4 „	After velvet beans, 33·6 bushels	25·2 „	9·	300
Rye ...	4·5 „	After peas, 23·5 bush'ls	19· „	9·85	400
Wheat ...	18·6 „	After melilotus, 26·9 bushels	8·3 „	6·50	46

SCUTELLISTA CYANEA.

Within the last two years the Department of Agriculture has on two occasions introduced this parasite of the black scale (*Lecanium oleæ*). The first introduction was from the Cape Colony, the second from California. An accident to the first plant which carried the scale insects among which the parasite fly was liberated, destroyed the chance of establishing it amongst us. The second effort bids fair to be more successful, and three colonies of the small calcid flies, all bred in the insectorium of the department, have been liberated in orchards well supplied with black scale.

The following notes, throwing some light on the habits of the scutellista, borrowed from the California Press, will be read with interest by many who are troubled with black scale in their gardens:—

"It does not yet certainly appear whether the scutellista cyanea will be as effective a parasite of the black scale as was expected. It was demonstrated the first year that the parasite would hold the scale thoroughly in check if it itself survived and multipled in this climate. That is not yet determined. In some localities it certainly does well and in others it tends to disappear. Why it is not yet known. Incidentally it may be said that the generic or family name of the insect is derived from its unusually big 'scutellum,' which is a triangular annex to its thorax. 'Cyanea' means blue, and scutellista cyanea means blue scutellista. Professor A. J. Cook, replying, in California *Cultivator*, to inquiries about this parasite, says:—

"'The fly belongs to the very valuable family—*Calcididæ*. These little flies are nearly all parasites, are very small, very compact in structure, have very simple wings, and, many of them, peculiar antennæ. Few insects are better marked. Many of them are very beautiful in colouration. This little South African fly is beautiful when looked at with the microscope, and certainly is very beautiful in its splendid service to us. I have never seen it lay its eggs, nor do I know how many it lays, but I have little doubt but that it lays them under the mature black scale, either just before or after the latter lays her eggs. So far as I have observed, the scutellista lives wholly upon the eggs of the black scale, and unless too late she does a most perfect job. In case the scutellista do not seem to do the work with absolute completeness, I think the explanation is to be sought in the fact that some of the scales did not receive eggs, or else the scutellista did not get to work until some of the eggs were hatched under the scale. It is perfectly astonishing how rapidly the little chalcid has spread, how numerous it has become, and how marvelously in has wrought in ridding trees and plants of the black scale. It is not easy to account for the fact that in some cases badly affected trees seem to have escaped.'

"May it not be that the scutellista was either two late or too early, that while it usually comes forth as a fly just at the dawn of the egg-laying of the scale, yet in some cases, I think they are rare, it is later in its arrival or else the scale is very late in its development and thus the latter escapes. It is the larva and not the fly which does the work. Insects often lay their eggs and die almost immediately when they find readily the proper place for egg-laying. In case they cannot find suitable food for their young they live for days or weeks. This may possibly be the case with the scutellista. They fly forth and come not again to the trees until the proper time for egg-laying, which, as we have seen, is just the time that the black scale lays her eggs. Again, the black scale hatch irregularly. I have found them in nearly every month of the year at every stage of growth. It is not possible that the little chalcid hies away from the citrus trees to find mature black scales, on other kind of trees or weeds, like the solanum, where it lays its eggs and thus provides not only for the continuance of the species, but for the enormous prolificness which has attracted such general attention."

THE MISTAKES THAT WE MAKE IN FARMING.

A writer in the *Country Gentleman* gives splendid advice to those who are not past learning:—

Indecision costs money, makes work, and prevents success. The habit of letting things go is easily acquired, and one soon gets so behind that he has no choice, but is compelled to, because of the results of the habit.

Not long ago a friend who had two men hired at seven shillings each per day was in doubt whether he should mow a lot of grass or wait for fairer weather. He asked the opinion of the help, who were not interested and advised waiting, no doubt thinking they would have an easier time. He asked his wife, who did not know. He had two teams harnessed, and then decided to wait and see. He fooled around all the forenoon and did nothing; then after dinner made up his mind and commenced mowing; but too late to put it up until the next afternoon. The second night it rained, and the hay was all spread out again. The third day most of it was drawn, but it was coloured by the dew and rain, was dusty from repeated dryings, and will not sell for anything more than No. 2, with a loss of eight shillings per ton.

A neighbour who has a telephone and daily paper, saw the weather report for the next day, heard it over the telephone, and commenced mowing early the next morning, and had it all in the barn before the rain the second night. He not only saved eight shillings per ton, but he got twice as much done for the money. The first man has been trying for two years to decide that he can afford either a paper or a telephone, and has lost enough in three days to pay for both for five years.

I had a poor cow, and a buyer came along who wanted one more to fill a car. He offered me a price, but not quite what I wanted. I hesitated, and being busy, let him go on, losing the sale for a few shillings. She has been on my hands all summer, and will not bring what he offered me last spring. She has robbed the other cows of needed food, and I have used needed time stripping her, without getting milk enough to pay. I had not decided to sell her, or given the subject thought, and was undecided when the chance came.

A farmer should look over the stock and his paper, and decide what things are worth, and whether he can afford to keep them at any price. There is more money lost by the fatal indecision of not ridding the farm of the old, infirm, or non-producers than in any other way. A man can make but a few shillings' profit on the best of each class of stock, and one or two poor ones consume that. Not more than half the animals kept pay for their feed at market prices, and so many of us are so undecided what the profit is, or which ones do pay, that we do nothing but simply take what is left from it all at the end of the year, and thank the Lord it is not less. There is no decision—knowledge—about it.

A year ago I decided suddenly to set a certain field with strawberries, and after ploughing it in the spring, covered it with manure purchased from a man in town. We harrowed it a few times, and set the plants. The ground was not in as good shape as it should have been, and it took longer and was harder work to set than usual. In a few days weed seeds from the manure began to appear, also grass from the turned-over sod. I had set the plants in rows one way, and had to hoe the strip between the plants. We found the manure had lain where the rains washed the seeds down to the yard from an old garden, and it contained all I ever heard of, and some more—malice (the "cheese" of boyhood), daisies, smartweed, chickweed, dock, and all kinds of grass. We cultivated and hoed once a week until the runners got to setting; then, after every rain, we pulled until our backs gave out. This spring it was a mat of everything, and we had a half-crop of fruit. We paid the other half and lots of cash for labour before deciding sooner.

I decided I would not do so again, and ploughed this year's bed at once, manured it with clean manure spread on the surface in autumn, and harrowed it once a week until winter. Last spring we ploughed it very shallow to loosen the surface, but so as not to bring up the old sod or weed seed from below, and harrowed as soon as possible.

We kept this up until nearly mid-summer, when it was mellow, and in fine condition for setting. I took all the teeth but one off the cultivator and marked out the field both ways in rows three by three feet. This one tooth tore up the soil six inches deep, but did not leave a deep trench, as the tooth was narrow. I could set the plants in this trench as fast as a boy could trim and drop them. Trimming off the top all but one young leaf removed all disease germs and insect foes, and made them easy to handle. I set them in one-quarter the time of the year before, and every one grew. There are thirty-three rows one way and thirty-nine the other—1,287 plants. After two cultivatings both ways and two hoeings, there is not a single weed in them. The first time I hoed them in three hours and the last time in six hours. This is all the work there has been done on them, and they are clean.

There was ten times the work done on last year's bed, and then it was a weed patch. Having cultivated both ways, the surface became mellow and the runners are rooting without any assistance, and will be self-supporting. We shall cultivate only one way hereafter, and shall have matted rows.

Some of the hills are a foot square now, and I am undecided whether I should cut off all runners and keep them in hills or let them go. One way I will have a big lot of medium-sized berries and the other fewer but very large ones. I suppose I should know which would be the most profitable, but I do not. Who will advise me?

We ploughed a field for planting with red raspberries in 1905, last spring, and planted it with early potatoes, hoping to keep them clean and subdue the weeds. The ease with which we are caring for the strawberries made the "year-beforehand" preparation very attractive, and not a weed was allowed.

Haying, berry-harvesting, and cultivating prevented any further work in them, and after a week's neglect I found millions of summer-grass seeds had germinated, not only in the centre of the row, but in the hills as well. Cultivating would not take them out of the hill, and I was undecided what to do. I knew I could pull it all by hand when it got big enough, but it is a dread job, and it would cut short the potato crop by taking the moisture, and disturbing the roots when we pulled the weeds. I tried the weeder, but after one bout decided that I was undecided whether the tops would straighten up again or not, and stopped. To-day the potatoes cannot be seen, for this pest covers them, except where I used the weeder. I can neither get time to pull them nor hire any help, and they must go. I know now the weeder would have killed most of it, and would not have hurt the potatoes. I, like a good many others, had read of the use of the weeder; in fact, had used one many times before, but failed to realise that the apparent damage to the crop was not real, and that the good effects from its use do not show at first.

A CHEAP BEE FOOD.

When the lives of so many colonies of bees are dependent upon the bee-keeper it seems that no one who keeps bees would think of getting along without having a good supply of frames filled with bee food for feeding the bees when short of stores. It is safe to say that if the owner of the apiary neglects his bees he will not only lose many colonies, but will be likely to fail of securing a crop of honey. Usually late swarms are not considered of much value. In the fall the beekeeper will brush off the bees, and take away what little honey they may have, and the poor bees will crawl back into the hive, cluster about the queen, and finally die a lingering death from starvation.

With me the late swarms are very valuable; in fact, much is due them for my success in getting surplus honey when so many fail. The value of the late swarms depends almost entirely on the management. As soon as there is a perceptible cessation of the honey flow, which is marked by the slaughter of the drones, I feed each colony twenty pounds of granulated sugar, with equal parts of water. Turn the syrup into shallow pans filled with broken pieces of comb, and place the dishes in the super story, or super, of the hives; turn back one corner of the enamelled cloth cover so that the bees will have access to the syrup. The feeding should be done in the afternoon when the weather is warm, from three to five pounds at a time for each colony, and the feeding should cover a period of about six weeks, as that will give the bees ample time to build out the combs and secure what nectar they may find in the fields. A year ago last fall I had eight late swarms that were not in a condition to winter. After feeding each colony twenty pounds of sugar, as I was not working for increase, I reduced the number to four by uniting or doubling up, as we call it.

This gave me four strong colonies and sufficient stores to winter, and forty frames of bee food that weighed 240 pounds, and the most of it capped over. Last August I took from these four colonies 160 sections of beautiful white clover honey that sold for $24. As the forty frames of bee food were worth more to me than what I paid for the sugar, there was a net profit of the $24. Two of the four colonies swarmed during apple blossoming, and it was from them that I got most of the honey. As the two new swarms took the place of the old, they are counted as two of the four, no account being taken of the old swarms that were set aside. They gave me no surplus, but they filled out the frames and went into winter quarters in good condition.

I do not think one needs to dwell long on the point to convince any sane man that late swarms are valuable when rightly managed. This way of obtaining bee food has much to commend it to the up-to-date bee-keeper, for the reason that it is cheap and practical and the food can be used at any time except during the severest cold weather.

BEE-KEEPING AS A SIDE ISSUE.

It may be safely said that any place where farming, gardening, or fruit-raising can be successfully followed is adapted to the profitable keeping of bees—in a limited way, at least, if not extensively. Many of these localities will support extensive apiaries. In addition to this there are, within the borders of this State, thousands of good locations for the apiarist—forest, prairie, swamp, and mountain regions—where agriculture has as yet not gained a foothold, either because of remoteness from markets or the uninviting character of soil or climate. This pursuit may also be followed in or near towns, and, to a limited extent, in large cities. It even happens in some instances that bees in cities and towns find more abundant pasturage than in country locations which are considered fair.

The Profit.—Although apiculture is extremely fascinating to most people who have a taste for the study of Nature—requiring, as it does, out of door life, with enough exercise to be of benefit to one whose main occupation is sedentary—the income to be derived from it when rightly followed is a consideration which generally has some weight, and is often the chief factor in leading one to undertake the care of bees. Certainly, where large apiaries are planned, the prime object is the material profit, for they require much hard labour and great watchfulness, and the performance of work at stated times in imperative, so that in this case there is less opportunity than where but a few colonies are kept to make a leisurely study of the natural history and habits of these interesting insects, because—unless the keeper is willing to forego a considerable portion of his profits—his time must necessarily be almost wholly taken up in attending to the most apparent wants of his charges.

One very naturally supposes that the return from a single hive, or several of them, in a given locality may be taken as a fair index of what may be expected each season. Such return, if considered average, may serve as a basis on which to reckon, but as so conditions influence it that great differences in actual results will be found to occur in successive seasons. Apiculture, like all other branches of agriculture, depends largely upon the natural resources of the location, and the favourableness or unfavourableness of any particular season, no matter how skillful the management, may make great differences in the year's return. Furthermore, profits are, of course, largely affected by the nature and proximity of the markets.

A moderate estimate for a fairly good locality would be 30 to 34 pounds of extracted honey, or 20 pounds of comb honey, per colony. This presupposes good wintering and an average season. When two or more of the honey-yielding plants are present in abundance and are fairly supplemented by minor miscellaneous honey plants the locality may be considered excellent, and an expectation of realising more than the yield mentioned may be entertained. With extracted honey of good quality at its present price each hive should, under favourable circumstances, give a gross annual return of £1 to £1 5s. From this about one-third is to be deducted to cover expenses other than the item of labour. These will include the purchase of comb foundation and sections, repairs, eventual replacing of hives and implements, and the interest on the capital invested.

Bee Forage.—With a small apiary planting for honey alone can not be made profitable. Small plats of honey-producing plants are valuable mainly because they afford an opportunity of observing when and under what circumstances the bees work on certain blossoms, and for the purpose of determining what might be depended upon to fill a gap in the honey resources of a given locality whenever the size of the apiary might make this a consideration of some importance. Even with a large apiary, probably no case exists in which, in the present condition of the subject, planting for honey alone would prove profitable. But when selecting crops for cultivation for other purposes, or shrubs and trees for planting, the bee-keeper should, of course, choose such as will also furnish honey at a time when pasturage for bees would otherwise be wanting.

As complete a list as possible should be made of the plants and trees visited by honey bees, and notes should be added as to period of blossoming, importance of yield, whether honey or pollen or both of these are collected, quality of the product, etc. If gaps occur during which no natural forage abounds for the bees, some crop can usually be selected which will fill the interval, and, while supplying a continuous succession of honey-yielding blossoms for the bees, will give in addition a yield of fruit, grain, or forage from the same land. The novice is warned, however, not to expect too much from a small area. He must remember that as the bees commonly go two and a-half to three miles in all directions from the apiary they thus range over an area of 12,000 to 18,000 acres, and if but one square foot in 100 produces a honey-yielding plant they still have 120 to 180 acres of pasturage, and quite likely the equivalent of 30 to 40 acres may be in bloom at one time within range of the bees. A few acres, more or less, at such a time will, therefore, not make a great deal of difference.

But if coming between the crops—especially if the bees, as is often the case, would otherwise have no pasturage at all—the area provided for them may be of greater relative importance than the larger area of natural pasturage; for it frequently occurs that the smaller part only of the honey produced by the field over which the bees of an apiary range can be collected by them before it is all washed out by rains or the liquid portion evaporated and the blossoms withered, while a small area may be more assiduously visited, and, the nectar, being gathered as fast as secreted, a greater yield per acre may result.

It is further of some importance to fill in such a gap with something to keep the bees busy, instead of letting them spend their time trying to rob each other; and, what is probably even more important, the pasturage thus furnished will keep up brood-rearing and comb-building and assist materially in preparing the colonies for the succeeding honey flow. There are many plants and trees of economic value, in addition to their production of honey, which may be utilised in most portions of the State in the manner indicated. Adaptability to climate and soil, the periods of honey dearth to be filled in, markets for the crop produced, etc., must all come in to influence the choice. The following list includes the more important plants of economic value in this country which are good pollen yielders. Most of those named are adapted to a considerable portion of the Union:—Fruit blossoms, locust, tulip tree, clovers, mustard, asparagus, pot herbs, parsnips, peppermint, cucumber, squash, pumpkin, melon, eucalypti, lucerne, etc.

The Products.—No method has yet been brought forward which will enable one at the present relative prices of honey and wax to turn the whole working force of the bees, or even the greater part of it, into the production into wax instead of honey; in fact, the small amount of wax produced incidentally in apiaries managed for extracted or for section honey is usually turned into honey the following season—that is, it is made into comb foundation, which is then employed in the same hives to increase their yield of marketable honey. It is even the case that in most apiaries managed on approved modern methods more pounds of foundation are employed than wax produced. Hence less progressive bee-keepers—those who adhere to the use of box hives and who cannot therefore, utilise comb foundations—are called upon for their wax product. As each pound of wax represents several pounds of honey, all cappings removed when preparing combs for the extractor, all scrapings and trimmings and bits of drone comb, are to be saved and rendered into wax. This is best done in the solar wax extractor; the essential parts are a metal tank with wire cloth strainer and a glass cover, the latter generally made double. The bottom of the metal tank is strewn with pieces of comb, the glass cover adjusted, and the whole exposed to the direct rays of the sun. A superior quality of wax filters through the strainer.

Another method is to enclose the cappings or combs to be rendered in a coarse sack and weigh this down in a tin boiler partly filled with rain water or soft spring water and boil slowly until little or no more wax can be pressed out of the material in the sack. Melting in an iron receptacle makes the wax dark coloured. A special utensil made of tin for use as a wax extractor over boiling water can also be used.

Caution.—The beginner will do well to proceed cautiously, bearing in mind that much experience is necessary to enable him to turn to the best account seasons below the average, while during poor seasons it will take considerable understanding of the subject, energetic action, and some sacrifice, to tide over, without disaster, or at least without such great discouragement as to cause neglect and loss of faith in the business. On the whole, there should be expected from the raising of bees for any purpose whatever only fair pay for one's time, good interest on the money invested, and a sufficient margin to cover contingencies. With no greater expectations than this from it, and where intelligence directs the work, apiculture will be found, in the long run, to rank among the best and safest of rural industries.

HOW TO LESSEN THE SWARMING IMPULSE.

The late Mr. L. Harrison, of America, was the first to put in print the statement "that bees never do anything invariably." That statement I found to be tolerably correct, and it pays to act in accordance with it. Yet in respect to the propensity of bees to swarm, I am rather inclined to believe an exception may be made in that proceeding.

I first ask the question, is there any difference in the nature of bees produced by queens reared during the swarming impulse and those produced by queens reared either before or after the swarming season is over?

Through reading standard works on bee subjects and from bee journals I was led to believe that the best and most desirable queens were to be obtained during the swarming season, and I therefore practised doing so, and I succeeded in rearing excellent queens, and I had as well plenty of excellent swarms produced by those queens afterwards, and might have had plenty more, but I did what I could to check the impulse, as I had quite as many hives of bees as I wanted.

How to prevent swarming was then my chief object in the management of my bees. I was satisfied with my hive, but I gave up rearing queens during the swarming season and practised rearing them before and after that period. I think it was Cheshire who stated that "eggs selected by the beekeeper for furnishing queens not laid by a mother, surrounded in her stock by the swarming fever, are likely to produce bees having a less tendency to swarm." Anyway I have kept up the practice, and for the last five or six years have had very few swarms, not 5 per cent., and I am in the same locality, using the same hive as I did then. Moreover, I sent 50 hives of my bees last year to one of my sons living in a good locality over 30 miles away, and those bees have swarmed no more than mine here. One more fact in corroboration: I caught a swarm of Italian bees having a nice young queen last year. That swarm was the first one from which a swarm issued this year. I have only had as yet one other swarm from my own bees. I am persuaded that if you consider for a minute you will find that those beekeepers of your acquaintance whose bees swarm considerably are those who obtain their young queens during the swarming season, and permit their bees to swarm as they like. Not those who obtain their queens reared before or after the swarming season. So I conclude that it is not so much the kind of hive you use as the kind of bee you keep that accounts for the number of swarms you get. Will Mr. Abram kindly give us his opinion?

Some time ago I stated that some swarms of bees in the apiary have the faculty of finding the source of nectar much better than others. I have made a practice of rearing queens from those bees and am well satisfied with the result. I am now giving the long-tongued bees a trial. I like their appearance, but I have not yet had them a sufficient time to learn their honey-producing qualities.

In reply to Mr. Hutchinson I would like to say that a correction should consist of or contain more than a simple contradiction, and will he kindly explain what he means when he says "bees will store honey better in shallow frames than in deep ones." In what way better? I repeat they do not, and should like to be proved to be in the wrong.—*Exchange.*

MARKET REPORT.

Messrs. Dalgety & Co., Limited, report as follows in connection with their daily sales of produce, held at Perth and Fremantle, for the week ended 6th January, 1905:—

Wheat.—Our head office cables that London market is weak. Cargoes of Australian wheat, for shipment January and February, are offering in London at 32s. 3d. to 32s. 6d. per quarter of 480lb., cost, freight, and insurance. Probably in sympathy with weaker London values, Melbourne and Adelaide markets are steadier at from 3s. 3½d. to 3s. 4d., at which price, however, much business is being transacted.

Local Wheat.—Advices from some districts, principally Narrogin and Beverley, indicate lighter yields than was anticipated, but yields in other districts have quite justified expectations. Sales of considerable quantities of wheat are reported from the country, the principal purchases having been probably made, as usual, on account of the mills, and much business has been transacted on the basis of 3s. per bushel at country stations. Many growers are not inclined to meet the market just yet, 3s. 2d. per bushel being asked for. On the basis of the above prices, we have sold during the week over three thousand bags. Consignments to Perth and Fremantle have latterly been very light, and these markets have, temporarily at least, firmed to 3s. 5½d. per bushel, at which price we to-day sold wheat from Waeel. A few trucks of wheat forwarded to these centres would probably sell at 3s. 5d. per bushel, but we could not recommend any considerable quantity.

Chaff.—Supplies to Perth and Fremantle have been decidedly irregular, the market fluctuating accordingly. Really prime green wheaten chaff from Cunderdin and Doodlekine has been sold at up to £4 2s. 6d. per ton. On the other hand, during the holidays some chaff was sold at low figures. On Wednesday there were 50 trucks of chaff forwarded to Perth and on Friday 48 trucks. Values, of course, ruled low, but on Friday particularly a large proportion of the chaff offered could not be guaranteed as sound. On the whole, the markets were firm at quotations. Although no noticeable improvement in prices can be reported, there is a strong undertone. In all probability heavy yardings of chaff will continue to come forward to market until March. Values are therefore not likely to improve very much during the intervening period. Our further private advices still indicate that the quantity of hay cut this year is probably much less than usual, and should this information prove correct, growers would be quite justified in holding for a better market. We now have stores at Perth and Fremantle for the use of those growers who cannot hold their chaff at country stations. As space is limited, those desirous of availing themselves of these facilities would do well to make early arrangements with us. Ruling rates at Perth and Fremantle are as follow;—Prime green wheaten chaff, guaranteed sound, from £3 17s. 6d. to £4 per ton, while extra sound samples might realise 2s. 6d. per ton more; fair average quality wheaten, from £3 10s. per ton to £3 15s. (guaranteed sound); medium wheaten, according to colour and condition of sample, from £3 2s. 6d. to £3 5s. and £3 7s. 6d. per ton; inferior chaff, from 52s. 6d. per ton upwards; oaten chaff, from £3 15s. to £4 per ton (market bare). There is a deal of chaff now coming on the market which has been damaged by the recent rains. This chaff, by selling at unsatisfactory prices, to a certain extent interferes with the sale of sound chaff, it being difficult for buyers in some cases to discriminate between sound and unsound. We therefore advise consigners to let us know promptly when trucks may be guaranteed sound.

Algerian Oats.—Local oats in any quantity are not yet on the market. We have a good buying inquiry, and sellers would now do well to communicate with us. Yesterday our Adelaide office reported that Algerian oats were procurable at 1s. 5½d., f.o b., Port Adelaide. At midday on Friday Melbourne sellers were offering Algerians at 1s. 7d., f.o.b., Melbourne, at which price it is reported that fair orders were booked for export. It was reported later in the day that Melbourne market was excited, and even much higher prices had been asked. Goldfields orders at the present time are still being supplied from Fremantle with imported Victorians. Stocks on spot are light, and 2s. 4½d. to 2s. 6d. is now being asked, whole and crushed, f.o.r., Fremantle. New Zealand oats are quoting at 3s. 2d. per bushel. We sold 1,200 bags pressed local Algerians at 2s. 4½d. per bushel, rails, Burke's siding.

Barley.—Early in the week our Adelaide office quoted 2s. 7d. to 2s. 9d. per bushel for malting barley. We have received no later information. We have good inquiries for locally-grown English barley.

Pressed Hay.—We have no business to report There are several parcels on the market, and we expect to arrange sales next few days. Nominal value from £3 2s. 6d. to £3 5s. and £3 7s. 6d. per ton, rails, Fremantle. We sold 300 tons at Burke's siding.

Straw.—Limited consignments coming forward, which, in view of the restricted demand, is satisfactory; price, £2 per ton, f.o.r., Perth and Fremantle.

Mill Offal.—Bran is very firm at 8½d. per bushel, f.o.b., Adelaide, and pollard at 9½d. per bushel, f.o.b., Adelaide.

Potatoes.—As anticipated by us, local potatoes are now firm. Stocks at these centres are light, and we attribute the improved position to the fact that the potatoes grown in close proximity to Perth by the market gardeners are now about cut out. Our Bunbury branch reports considerable orders from the goldfields, and to-day we have received orders for Perth and Fremantle buyers at from £6 to £6 5s. and £6 7s. 6d. per ton, f.o.r., Bunbury and adjacent stations, according to distance. We sold one truckload of extra prime potatoes at £6 12s. 6d. per ton, Busselton. Melbourne market is steady at £5 15s. per ton.

KALGOORLIE.

Chaff Report.—We have to report that arrivals of chaff throughout the week have been exceptionally light; in fact the total arrivals for the past three days have been only one truck. The week opened with a fair demand for prime at £4 10s. per ton, and, owing to the light arrivals, closed with a keen demand for prime at £4 15s. per ton, extra green samples realising 2s. 6d. per ton more. We are confident that if the present rate of arrivals continues, values will be well maintained, and that in the near future prime samples will realise £5 per ton. Ruling rates are as follow:—Prime green wheaten, £4 15s. per ton; good quality wheaten, £4 10s. per ton; medium quality, £4 per ton.

WOOL, HIDES, SKIN, TALLOW, ETC.

Messrs. Dalgety & Co., Ltd., Fremantle, report that sales have been resumed, after a lapse of a fortnight. Supplies had accumulated considerably during the holidays, and it was found necessary to hold a special sale for hides.

Wool.—A fair catalogue was submitted to a full attendance of buyers, strong competition ruling throughout, and a ready clearance was effected of all offering at prices fully up to those ruling last year. Fleece, good quality (none forward); fleece, medium quality, 8¼d. to 8⅞d.; fleece, inferior quality, 6d. to 7½d.; lambs', 5½d. to 6⅝d.; bellies and pieces, 4d. to 5d.; locks, 1d. to 2½d.

Sheepskins.—These were in good supply, and while damaged lines sold slightly in buyers' favour, all sound-conditioned lots were eagerly competed for. Full wool skins are practically finished, and as prices may be misleading, we will leave them out of our quotations. Shorn pelts and short-wool skins now comprise the bulk of our offerings. Prices for merinos were firmer, and crossbreds ruled from ⅛d. to ¼d. per lb. higher:—Good merino, quarter to half wool, 6¼d. to 6¾d.; medium merino, quarter to half wool, 5½d. to 6¼d.; fine crossbred, half to three-quarter wool, 5¾d. to 6½d.; pelts, merino and fine crossbred, 5d. to 5⅝d.; pelts, coarse crossbred, 4½d. to 4¾d.; pelts, shearings, 4¼d. to 4½d.; lambs', 5¼d. to 5¾d.; lambs', pelts, 4½d. to 5d. In all cases where pelts of above are sundried, weevil-eaten, torn, or perished, prices are from 1d. to 2d. below quotations.

Kangaroo Skins.—We brought forward a large and representative assortment, which met a strong market and keen competition, any change in values being in sellers' favour. ¾lb. to 1lb. average, blue skins 2s. 5d. to 2s. 6d., red skins 2s. 2d. to 2s. 4d.; 1lb. to 1½lb. average, blue skins 2s. 2d. to 2s. 3d., red skins 2s. to 2s. 2d.; 1½lb. to 2lb. average, blue skins 1s. 9d. to 2s., red skins 1s. 7d. to 1s. 10d.: extra heavy and very light weights, blue skins 1s. 2d. to 1s. 8d., red skins 1s. 2d. to 1s. 6d.; damaged lines, blue skins 1s. to 1s. 10d., red skins 1s. to 1s. 8d.; euro skins, red, 1s. 2d. to 1s. 7d.; brush kangaroo, blue skins, 1s. to 1s. 4d.

Tallow.—A small offering elicited keen competition, with a rise in value of at least 1s. per cwt. Good mixed (in casks), to 20s. 6d. per cwt.; medium (in casks), 19s. per cwt.; inferior (in casks), 17s. to 17s. per cwt.; tins and oddments, 16s. to 18s. per cwt.

Hides.—This market was well supplied, and the improved values noticed in our last report were well maintained. Heavies (special), to 5¼d.; heavies, 4½d. to 4¾d.; medium and light, 4½d. to 4⅞d.; medium and light (dirty condition), 4⅛d. to 4½d.; dry, 4d. to 5¼d., damaged and cut, 3½d. to 4d. Attention to flaying and preparation for market is very necessary, and results in enhanced values.

Horns, Hair, etc.—Moderate offerings were submitted, and values received admit of no alteration in quotations. Horns, large and fresh, 40s. to 42s. per 100; small and fresh, 15s. to 15s. 6d. per 100; stale and perished, 5s. to 10s. per 100; very small, 4s. to 6s. per 100; rough bones, 3s. 6d. per cwt.; horse hair, 1s. per lb.; cow hair, 6d. per lb.

Messrs. Frank Smalpage & Co. report under Saturday's date:—Business quiet all this week in all classes of horses and dairy stock.

Horses.—Imported draughts selling slowly at easier rates. One shipment landed through the week, but there are still a number on hand from previous shipments, which are going off slowly. In light horses the demand is quiet, and sales very slack. We had a fair yarding at our customary Saturday's sale, but only placed 16, at quotations.

Dairy Cattle.—Some very good cows forward, but demand quiet. Young stock easy at quotations.

Sheep.—We had 50 ewes and wethers and 100 lambs forward at our yard on Thursday. We placed 50 lambs, light-weights, at 10s. 6d., but passed in all the others.

Pigs.—Market eased again, and prices were the lowest for the season. We yarded 107 on Thursday, quality varying from small weaners to prime baconers. There was the usual attendance of the trade, but we had great difficulty in clearing the yards at quotations.

Goats.—A small inquiry for good milkers; but stores and young goats very difficult to sell.

Comparing the past week with the same time last year, we find that there is a considerable shrinkage in values all round. In the heavy and medium draught horses there is a fall from £5 to £10 per head, and in dairy cows a fall of from £3 to £5 a head. Our sales and quotations for the week are as under:—

Medium draughts, imported, £32 to £42; light harness, extra, to £30; do., medium to average, £7 to £15; ponies, £1 15s. to £8. Dairy cows, best, £14 to £18; do., good, £10 to £12; young dairy cattle, 35s. to £4 15s. Sheep, lambs, 9s. to 10s. 6d. Pigs, baconers, 45s. to 59s. each; light porkers, 21s. to 26s.; slips, extra quality, 21s.; do., average, 10s. to 14s.; do., weaners, 7s. to 10s.; do., extra quality, 15s.; sows, 35s. to 53s.

Messrs. F. & C. Piesse, Theo. Lowe & Co., Ltd., report under Saturdays date:—

Fruit.—Fair supplies of local to hand and prices for prime still good. Prime cherries from Mt. Barker made up to 9s. Apricots, from 7s. 6d. to 11s. 6d. ½-case, 18s. 6d. to £1. Cape gooseberries, 3d. to 3¾d. Apples, to 17s. 6d. Pears, 10s. Figs, ¼-case, 6s. to 6s. 6d.

Eggs.—Best suburban lots up to 1s. 6d.; country, do., 11d. to 1s. 2d.

Poultry.—Heavy coopings to hand and prices fair. Prime fowls made up to 8s.; other lines from 5s. 6d upwards. Ducks, 6s. to 8s. Geese, 12s. 6d. to 15s.

Vegetables.—Being an off day, supplies were small. New potatoes, fresh dug, made up to £9; other lines, 5s. 6d. to 8s. 6d. Onions, 7s. 6d. Peas, ¾d. to 1½d. French beans, 1d. to 1¼d.

GARDEN NOTES FOR FEBRUARY.

By PERCY G. WICKEN.

In Western Australia, this month is about the warmest of the year, and, as we have had no rain for some three months, the soil in most places has become too dry to permit of many vegetables being grown, except in low-lying and swampy places, or in such spots as a good supply of water from permanent sources is obtainable. Under these latter conditions a supply of vegetables can be kept up all the year round, but under ordinary conditions very little can be done in the vegetable garden except to try, by means of incessant cultivation, to keep alive such plants and flowers as may be growing. In small beds, where it is inconvenient to keep stirring the surface, the same result may be obtained by applying to the surface of the soil a mulch of well-rotted vegetable matter, which will have the effect of preventing the evaporation of the moisture from the surface, although at the same time it is likely to act as a harbour for insect pests. As soon as a plant has ceased to be profitable it should be either pulled up and thrown on the compost heap or else dug into the ground; no plant should be allowed to seed unless the seed is required for sowing or for sale.

Noxious weeds, such as stinkwort and nut grass, will be seeding during this month, and steps should be taken to cut down all such pests before they have the opportunity to mature their seeds.

BEANS (French).—If there is sufficient moisture in the soil to germinate the seed, a few more rows of these beans may be sown.

BEANS (Madagascar).—These prolific climbers should now be in full-bearing, and the pods should be picked as young as possible, otherwise they become tough and fibry.

BEANS (Lima) should now be in bearing. They are eaten the same as green peas; but, if in superabundant supply, they can be dried and kept until the winter, the same as haricot beans, and are equally as nice.

BEET (Red).—A further supply of seed may be sown. They require a rich soil, or land that has been well manured for the previous crop. They should be sown in drills about 18 inches apart, and from 9 to 12 inches apart in the drills. Those already planted will require to be thinned out to this distance.

BEET (Silver).—A little more seed may be sown, and plants already up can be thinned out. The outside leaves of this plant should always be cut for use, leaving the inside leaves to mature for future cutting.

BRUSSELS SPROUTS.—These should do well in the cooler parts of the State. Plant and treat the same as cabbages.

CABBAGE.—Make seed-beds, either in boxes or on the ground, so as to raise as many plants as you are likely to want to plant out this season. The soil in these beds should be very fine, and well mixed with fine well-rotted manure, so as to produce good healthy plants for planting out later on.

CARROTS.—Prepare land by digging deeply and working up fine. Fresh manure should not be applied to this crop, but use land that has been manured the previous season. The seeds germinate slowly, and therefore the seed beds require to be kept free from weeds.

CAULIFLOWERS.—Make seed beds and plant out seeds same as for cabbages, and early plants will then be obtained, available for planting out at the first opportunity.

MELONS.—All those melons and pumpkins required for seed should be allowed to become thoroughly ripe before cutting from the vine, and the seed when removed from the pulp should be thoroughly dried before being stored away.

SWEET POTATOES.—Some early ones may be ready for digging by the end of the month, but the main crop will not be ready until next month.

POTATOES.—Land should be prepared by being well worked and manured for sowing a crop of potatoes at the earilest opportunity in favourable localities; where there is sufficient moisture a crop may be obtained before the frost comes.

TOMATOES.—Destroy by burning or boiling all diseased fruit and tie up all plants to stakes to keep them off the ground.

TURNIPS.—Where sufficient moisture is present in the soil or can be supplied, both white and swede varieties, should be planted; it is the early crop that generally pays best, and is also freest from aphis and other disease.

FARM.—Harvesting now being completed, the principal work on the farm will be chaff-cutting, threshing, and carting the product of these operations to market. When cutting chaff, it will always be well to remove the string bands from the sheaves before putting through the machine. Cutting string bands with the sheaves has become a common practice the last few years, and caused the death of several horses. Chaff in which string is found will generally bring a lower price than good quality chaff, and the loss is much greater than the value of the time taken to cut off the bands. Where the ground is of a light nature or sufficiently moist to enable ploughing to be carried out in a satisfactory manner, the work should be pushed on with as rapidly as possible, so as to have as large an area of land as possible ready to sow early in the season.

Unless the land is friable enough to enable the ploughing to be well done, it is better to leave it alone until the rain sets in; ground which is only scratched over and broken up at uneven depths, and in some places hardly touched, will never give satisfactory results, and accounts for many instances of the reported failure of crops which have been put down to summer ploughing. The improved disc ploughs now on the market enable ploughing to be carried out at any time, as they will break up the hardest ground.

Serious losses from bush fires have already occurred, and no doubt before these notes appear in print many others will be reported. The frequent reports of disaster from this cause should do more to impress on the minds of settlers the necessity of making firebreaks than the continual reference to the subject in these notes. It is often suggested that it should be made compulsory for all settlers to make firebreaks around their properties, to help to check these large bush fires.

THE CLIMATE OF WESTERN AUSTRALIA DURING DECEMBER, 1904.

The weather in the South-West districts was chiefly noticeable for two things, the somewhat unusual heat about the middle, culminating in the hottest day ever experienced in Perth (20th) since the Observatory records commenced (in 1896), and the delightful spell of cool weather which followed and lasted well into the new year. The dwellers on the Goldfields were not so fortunate, for there the heat lasted till 30th December, when a cool change occurred. The heat from which they suffered was connected with a large shallow barometic depression, extending right across to the other States, or more probably a series of two or three shallow "lows" travelling across from our North-West coast to South Australia and Victoria, and causing one of the most severe heat waves ever experienced in the Eastern States. A decided change occurred on our Goldfields on the 30th, when monsoonal rains passed across from about Geraldton to Esperance, with great diminution of temperature.

On the whole the pressure throughout the State has been almost identical with the means of previous years, but the temperature has been generally in excess, being especially noticeable on the Goldfields. The highest reading for the month was 112·5°, at Marble Bar, and the lowest 37·2°, at Eyre. The lowest average night minimum (48·2°) is recorded at Bridgetown, and the lowest average day maximum at Breaksea (67°). At the latter place the highest temperature recorded during the month was only 79°, and at the Leeuwin it was even less, viz., 76°.

The rainfall was in excess of the average in the track of the above-mentioned monsoonal rains, viz., from Geraldton through the Southern Coolgardie Goldfields to Esperance. Elsewhere it was about normal, but very patchy in the Tropics.

The Climate of Western Australia during December, 1904.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						December, 1904.					* Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan 1.
North-West and North Coast:	Wyndham	29·806	29·798	29·946	29·643	98·0	80·1	89·0	104·4	73·6	98·2	80·9	109·5	68·0	534	10	3522
	Derby	29·820	29·802	29·909	29·692	98·7	79·3	89·0	108·2	73·6	97·3	78·7	110·5	70·0	94	7	3314
	Broome ...	29·829	29·812	29·935	29·739	94·0	79·1	86·6	102·8	70·8	93·6	79·0	108·9	69·3	473	5	2857
	Condon ...	29·812	29·794	29·985	29·657	93·7	74·3	84·0	103·5	66·0	94·3	73·7	115·0	60·0	32	3	694
	Cossack ...	29·801	29·801	29·969	29·449	99·0	77·2	88·1	109·0	72·8	98·1	75·8	112·7	65·0	21	1	1344
	Onslow ...	29·805	29·798	29·950	29·500	96·0	72·0	84·0	108·0	61·0	97·9	69·9	115·0	54·5	117	2	1648
	Winning Pool	...	..	...	...	...	...	...	...	...	...	...	...	...	108	2	1844
	Carnarvon ...	29·860	29·858	30·045	29·691	86·9	69·7	78·3	105·0	61·5	84·8	68·4	110·5	53·2	42	2	1136
	Hamelin Pool...	29·865	29·865	30·130	...	96·0	65·5	80·5	111·0	59·6	95·0	64·3	111·8	63·2	20	3	1079
	Geraldton ...	29·930	29·932	30·147	29·709	80·8	62·4	71·6	106·2	53·5	81·0	61·0	111·0	48·8	126	4	1622
Inland:	Hall's Creek ...	29·820	29·814	...	29·636	101·4	76·0	88·7	106·8	65·4	101·8	76·3	110·2	60·0	125	5	2959
	Marble Bar ...	...	...	...	...	106·4	77·0	91·7	112·5	68·5	106·5	76·2	118·8	65·2	60	9	1174
	Nullagine ...	29·795	29·748	30·000	29·633	102·5	71·5	87·0	109·0	58·2	104·0	73·1	113·0	58·9	170	10	1002
	Peak Hill ...	29·780	29·781	29·990	29·550	99·0	72·0	85·5	107·0	63·0	98·7	72·6	109·7	54·3	170	6	1109
	Wiluna ...	29·786	29·750	30·021	29·482	98·8	71·4	85·1	106·9	58·3	96·9	68·6	110·1	53·9	57	4	1071
	Cue	29·837	29·820	30·033	29·559	99·4	70·1	84·8	110·2	57·8	98·3	68·6	112·0	50·5	53	5	1329
	Murgoo ...	...	...	...	...	...	...	...	...	...	...	...	...	...	55	3	843
	Yalgoo ...	29·859	29·846	30·103	29·612	97·7	67·3	82·5	110·2	56·0	96·0	64·5	113·5	49·8	61	3	916
	Lawlers ...	29·822	29·823	30·105	29·556	97·1	72·0	84·6	107·1	61·2	95·5	69·2	110·4	52·3	234	8	1246
	Laverton ...	29·820	29·837	30·075	29·622	97·3	69·2	83·2	109·0	60·5	92·9	65·0	110·0	50·3	168	6	1908
	Menzies ...	29·856	29·855	30·107	29·535	96·0	67·4	81·7	107·0	53·8	92·6	65·2	110·9	49·2	57	5	970
	Kanowna ...	...	...	...	...	94·2	63·9	79·4	108·0	53·2	...	...	...	...	5	1	1004
	Kalgoorlie ...	29·880	29·843	30·186	29·549	93·9	64·2	79·0	108·8	55·5	90·5	61·9	110·0	47·9	50	2	1091
	Coolgardie ...	29·879	...	30·195	29·570	93·0	62·2	77·6	108·6	53·2	90·6	60·5	110·2	47·6	81	5	1197
	Southern Cross	29·885	29·879	30·176	29·592	94·5	61·8	78·2	110·8	49·0	91·8	60·1	111·3	46·9	88	1	1745
	Kellerberrin ...	...	...	...	...	...	...	...	...	...	...	...	...	...	169	5	2123
	Walebing ...	...	...	...	...	88·5	58·4	73·4	108·0	44·0	85·6	56·6	106·0	44·0	170	4	2321
	Northam ...	...	...	...	...	91·3	59·4	75·2	109·0	47·0	87·5	58·0	106·4	44·1	153	3	2431
	York	29·925	29·933	30·166	29·644	88·9	58·3	73·6	105·6	46·4	88·9	57·6	114·5	44·6	192	3	2328
	Guildford ...	...	...	...	...	86·2	59·7	73·0	109·4	44·4	82·7	57·5	106·0	42·0	21	4	3458

* Averages for three years only.

The Climate of Western Australia during December, 1904—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						December, 1904.					* Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:	Perth Gardens ...	29·958	29·96	30·195	...	84·1	62·3	73·2	107·2	51·6	82·8	60·5	105·0	46·0	24	3	3461
	Perth Observatory	29·966	29·968	30·215	29·670	81·0	61·1	71·0	107·9	49·2	79·7	60·0	102·8	49·2	33	6	3435
	Fremantle ...	29·979	29·972	30·214	29·708	77·1	62·9	70·0	102·0	55·5	76·4	61·4	104·0	51·5	20	3	3068
	Rottnest ...	29·963	29·950	30·192	29·729	74·5	62·6	68·6	95·4	57·2	74·5	61·6	102·0	50·7	13	3	2558
	Mandurah ...	...	...	...	...	81·5	59·3	70·4	97·0	49·0	79·5	57·4	99·8	43·6	4	3	3570
	Marradong ...	...	...	...	...	...	...	...	...	...	...	...	...	...	75	4	3346
	Wandering ...	...	...	...	...	88·2	50·8	69·5	110·2	40·0	82·7	50·6	104·0	36·8	32	4	3070
	Narrogin ...	...	...	...	...	83·1	53·6	68·4	100·0	43·0	...	...	...	...	100	7	2485
	Collie	...	...	...	...	82·6	51·4	67·0	100·5	40·6	79·8	50·7	99·0	39·5	48	6	3343
	Donnybrook ...	...	...	...	...	82·1	53·2	67·6	100·3	41·8	78·6	51·6	96·5	39·8	52	3	3260
	Bunbury ...	29·984	29·989	30·209	29·717	78·2	57·0	67·6	93·2	47·0	78·0	55·8	101·5	44·4	13	4	3338
	Busselton ...	...	...	...	...	80·2	53·2	66·7	93·0	44·0	77·1	52·9	93·0	40·2	27	6	2907
	Cape Naturaliste	29·984	...	30·205	29·690	72·8	56·9	64·8	88·5	50·2	...	...	...	...	37	7	2904
	Bridgetown ...	...	...	...	...	82·2	48·2	65·2	100·0	38·0	78 3	48·6	96·9	36·0	51	5	3011
	Karridale ...	29·998	30·002	30·160	29·780	73·0	55·0	64·0	94·0	46·0	73·5	54·4	101·0	43·0	20	5	4121
	Cape Leeuwin ...	29·975	29·974	30·210	29·650	72·0	60·0	66·0	76·0	55·0	71·3	59·8	98·4	53·0	64	15	3435
	Katanning ...	29·932	29·949	30·189	29·661	85·2	52·8	69·0	101·5	45·2	83·4	52·8	105·8	41·0	93	5	2023
	Mt. Barker ...	...	...	...	...	78·3	51·1	64·7	96·5	41·0	...	...	...	...	61	7	...
	Albany	29·992	29·990	30·257	29·733	72·5	54·2	63·4	85·6	45·0	71·4	54·9	103·0	41·2	99	10	4378
	Breaksea... ...	30·000	29·985	30·360	29·640	67·0	58·0	62·5	79·0	53·0	68·1	57·2	94·0	46·0	80	11	3381
	Esperance ...	29·970	29·980	30·240	29·690	74·0	56·0	65·0	102·0	45·0	76·5	57·0	108·0	40·8	195	3	3251
	Balladonia ...	29·950	29·924	30·300	29·624	89·3	56·9	73·1	108·9	46·1	84·0	54·2	108·8	42·5	9	1	994
	Eyre	29·934	29·996	30·262	29·602	79·3	57·3	68·3	105·0	37·2	77·1	56·6	112·2	38·2	3	1	1328
INTER-STATE.																	
	Perth	29·966	29·968	30·215	29·670	81·0	61·1	71·0	107·9	49·2	79·7	60·0	102·8	49·2	33	6	3435
	Adelaide	29·959	29·946	30·267	29·460	85·6	59·0	72·3	113·0	47·1	83·7	59·1	114·2	43·0	Nil	...	2202
	Melbourne	29·932	29·820	30·257	29·606	78·1	53·4	65·8	102·0	44·7	75·4	53·7	110·7	40·0	11	...	...
	Sydney	29·960	29·918	30·229	29·710	80·0	65·0	72·5	108·0	58·0	77·1	62·8	104·1	49·3	88	4	4494

* Averages for three years only.

The Observatory, Perth, January, 1905.

W. E. COOKE, Government Astronomer.

RAINFALL for November, 1904 (completed as far as possible), and for December, 1904 (principally from Telegraphic Reports).

STATIONS.	NOVEMBER.		DECEMBER.		STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.		No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:					NORTH-WEST:				
Wyndham ...	30	2	528	8	Wallal	Nil	...	...	...
6-Mile	...	...	...	...	Condon	13	1	32	3
Carlton	...	...	...	...	Pardoo	...	...	...	...
Rosewood Downs	...	...	...	...	DeGrey River ...	Nil	...	...	...
Argyle Downs ...	...	...	...	...	Port Hedland ...	Nil	...	13	2
Lisadell	...	...	...	...	Boodarie ...	...	...	...	...
Turkey Creek ...	35	3	224	7	Warralong ...	Nil	...	...	...
Hall's Creek ...	73	4	125	5	Muccan	Nil	...	...	...
Nicholson Plains	...	...	...	...	Ettrick	...	...	...	...
Flora Valley ...	...	...	...	...	Mulgie	Nil	...	...	...
Ruby Plains ...	...	...	...	...	Eel Creek ...	Nil	...	...	...
Denison Downs...	75	...	...	...	Station Peak ...	...	...	...	...
					Coongon	...	...	...	...
					Warrawagine ...	...	...	...	...
					Bamboo Creek ...	22	2	200	11
					Marble Bar ...	5	2	60	9
					Warrawoona ...	Nil	...	246	...
WEST KIMBERLEY:					Corunna Downs...	Nil	...	...	...
					Nullagine ...	Nil	...	170	10
Obagama ...	...	...	...	...	Mt. Edgar ...	...	...	...	...
Beagle Bay ...	93	1	..	...	Kerdiadary ...	Nil	...	...	...
Pt. Torment ...	...	...	...	...	Roy Hill... ...	Nil	...	...	...
Derby	26	3	94	7	Middle Creek ...	Nil	...	...	...
Yeeda	...	...	...	...	Mosquito Creek	...	...	...	...
Liveringa ...	...	...	...	...	Mulga Downs ...	Nil	...	...	...
Leopold Downs...	...	...	...	...	Woodstock ...	Nil	...	...	...
Fitzroy Crossing	77	7	235	3	Mt. Florence ...	...	...	...	...
Fitzroy (C. Blythe)	...	...	..	...	Tambrey ...	Nil	...	...	...
Quanbun ...	...	...	...	...	Millstream ...	Nil	...	...	...
Nookanbah ...	...	...	...	...	Yandyarra ...	...	...	...	...
Broome	2	1	473	5	Mallina	Nil	...	...	...
Roebuck Downs	79	2	...	...	Whim Creek ...	17	1	61	2
Thangoo... ...	...	...	...	...	Cooyapooya ...	...	...	...	...
La Grange Bay...	2	1	191	5	Woodbrooke ...	20	1	...	...

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST—*cont.*				
Croydon	12	2	...	...
Balla Balla	...	...	...	...
Roebourne	Nil	...	72	2
Cossack	Nil	...	21	1
Fortescue	Nil	...	70	...
Mardie	15	1	...	...
Mt. Stewart	Nil	...	...	...
Yarraloola	...	...	...	...
Chinginarra	Nil	...	...	...
Onslow	3	1	117	2
Peedamullah	...	...	...	...
Red Hill	...	...	...	...
Mt. Mortimer	32	1	...	...
Peake Station	Nil	...	...	...
Wogoola	...	...	...	...
Nanutarra	Nil	...	...	...
Yanrey	15	1	...	...
Point Cloates	...	...	...	...
GASCOYNE:				
Winning Pool	Nil	...	112	2
Coordalia	...	...	...	...
Towara	40	1	...	...
Ullawarra	...	...	...	...
Maroonah	...	...	...	...
Gifford Creek	...	...	...	...
Bangemall	...	...	...	...
Mt. Augustus	...	...	...	...
Minnie Creek	...	...	...	...
Yanyeareddy	Nil	...	...	...
Williambury	...	...	...	...
Booloogooroo	Nil	...	...	...
Wandagee	...	...	...	...
Minilya	...	...	...	...
Bernier Island	...	...	...	...
Boolathana	...	...	...	...
Carnarvon	Nil	...	42	2
Brick House	Nil	...	...	...
Doorawarra	Nil	...	...	...
Bintholya	Nil	...	...	...
Mungarra	Nil	...	...	...
Clifton Downs	Nil	...	...	..
Dairy Creek	Nil	...	...	...
Upper Clifton Downs	...	...	...	...

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Dirk Hartog Island	..	...	...	...
Sharks Bay	Nil	...	5	1
Kararang	1	1	...	...
Meedo	Nil	...	...	...
Tamala	...	...	...	...
Wooramel	Nil	...	69	2
Hamelin Pool	Nil	...	20	3
Byro	Nil	...	...	...
Yarra Yarra	31	2	...	...
Berringarra	57	2	...	...
Mt. Gould	...	...	...	...
Moorarie	...	...	...	...
Wandary	...	...	...	..
Peak Hill	6	1	170	6
Horseshoe	38	2	109	7
Mt. Fraser	Nil	...	82	4
Abbotts	...	...	44	2
Belele	Nil	..	96	2
Mileura	...	...	Nil	...
Milly Milly	33	1	Nil	...
Manfred	7	2	...	...
New Forest	34	1	...	...
Woogorong	71	1	40	1
Boolardy	20	1	Nil	...
Twin Peaks	...	...	...	...
Billabalong	Nil	...	...	...
Wooleane	47	1	...	...
Murgoo	34	2	55	3
Yallalonga	...	...	...	...
Meka	Nil	...	204	2
Mt. Wittenoom	10	2	...	...
Nannine	Nil	...	62	4
Star of the East	Nil	...	19	4
Annean	13	2	...	...
Coodardy	Nil	...	40	2
Cue	10	2	53	5
Day Dawn	Nil	...	25	1
Lake Austin	24	2	46	2
Lennonville	Nil	...	82	4
Mt. Magnet	Nil	...	31	1
Challa	23	1	22	2
Youeragabbie	Nil	...	118	3
Murrum	Nil	...	...	...
Burnerbinmah	44	2	39	4
Barnong	6	1	162	3
Mellenbye	4	1	80	4

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Yalgoo	13	2	61	3
Wagga Wagga	...	...	36	1
Gabyon	Nil	...	...	...
Gullewa	81	2	186	3
Muralgarra	64	2	...	...
Wydgee	50	2	...	...
Black Range	Nil	...	...	...
SOUTH-WEST DIVISION (NORTHERN PART):				
Murchison House	17	3	37	1
Mt. View	30	1	...	...
Mumby	33	2	50	2
Yuin	22	1	77	2
Northampton	47	1	74	2
Narra Tarra	18	1	104	1
Tibradden	...	...	...	...
Myaree	33	2	97	3
Sand Springs	Nil	...	98	1
Mullewa	81	2	55	2
Kockatea	82	2	75	3
Bootenal	Nil	...	...	...
Geraldton	29	4	126	4
Greenough	16	2	152	3
Bokara	25	2	127	3
Dongara	13	1	...	...
Dongara (Pearse)	...	...	...	...
Strawberry	2	1	...	...
Nangetty	Nil	...	...	...
Mingenew	13	2	86	4
Urella	61	1	85	1
Yandenooka	...	...	...	...
Rothesay	Nil	...	...	...
Field's Find	5	1	80	4
Carnamah	27	3	127	4
Watheroo	13	1	129	3
Dandaragan	61	3	89	5
Moora	20	2	138	4
Yatheroo	24	2	79	3
Walebing	60	4	170	4
Round Hill	36	2	429	3
New Norcia	91	2	130	2
Wannamel	48	2	122	7

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WESTERN DIVISION, CENTRAL (COASTAL):				
Gingin	77	4	87	5
Belvoir	43	3	37	2
Mundaring	119	2	69	3
Wandu	68	6	49	6
Guildford	55	4	21	4
Kalbyamba	69	4	18	2
Canning W't'r'w'ks	68	3	31	3
Perth Gardens	57	4	24	3
Perth Observatory	61	4	33	6
Subiaco	62	6	33	5
Fremantle	73	5	20	3
Rottnest	40	4	13	3
Armadale	...	...	...	...
Rockingham	68	4	30	4
Jarrahdale	158	4	62	4
Mandurah	74	3	4	3
Pinjarra	43	3	25	4
Yarloop	84	7	36	6
Harvey	56	6	50	7
Upper Murray	135	5	89	5
SOUTH-WEST, CENTRAL PART (INLAND):				
Hatherley	21	2	198	2
Dowerin	13	1	175	3
Momberkine	...	...	...	...
Monglin	26	2	216	2
Newcastle	89	3	136	2
Eumalga	64	2	137	1
Northam	37	2	153	3
Grass Valley	24	2	171	1
Meckering	Nil	...	191	3
Cunderdin	33	2	198	1
Codg-Codgin	18	3	193	7
Yarragin	10	2	134	6
Doongin	27	3	167	3
Cuttening	25	2	...	...
Whitehaven	...	...	...	...
Sunset Hills	48	3	164	1
Cobham	29	3	156	6

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST, CENTRAL—*contd.*				
Yenelin	31	5	205	2
Mt. Caroline ...	...	...	182	1
York	24	2	192	3
Dalbridge ...	28	1	180	2
Beverley ...	26	2	196	2
Bally Bally ...	28	3	202	2
Barrington ...	108	3	...	...
Stock Hill ...	15	1	144	2
Sunning Hill ...	43	3	235	6
Brookton ...	42	3	141	3
Wandering ...	91	5	32	4
Pingelly ...	10	1	132	4
Marradong ...	76	2	75	4
Bannister ...	76	3	8	3
Wonnaminta ...	37	2	79	4
Narrogin ...	63	5	70	5
Narrogin State Farm	53	4	100	7
Wickepin ...	49	3	197	5
Gillimanning ...	31	3	131	6
Bunking ...	37	2	...	...
Bullock Hills ...	48	4	...	...
Bullingarra ...	48	2	...	...
SOUTH-WEST DIVISION (SOUTHERN PART):				
Bunbury ...	60	4	13	4
Collie	68	6	48	6
Glen Mervyn ...	56	3	51	5
Donnybrook ...	128	4	52	3
Boyanup ...	52	4	52	3
Ferndale ...	116	3	...	...
Busselton ...	92	6	27	6
Quindalup ...	112	4	33	2
Cape Naturaliste	93	5	37	7
Lower Blackwood	129	4	67	4
Karridale ...	116	5	52	10
Cape Leeuwin ...	95	9	69	15
Biddellia ...	110	3	106	6
The Warren ...	190	7	125	9
Lake Muir ...	207	9	75	6
The Peninsula ...	124	9	...	...

STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST—*continued.*				
Mordalup ...	...	...	...	...
Deeside	171	7	56	5
Riverside ...	157	7	68	5
Balbarup ...	92	5	51	5
Wilgarup ...	112	8	75	9
Bridgetown ...	105	6	51	5
Westbourne ...	65	15	65	7
Hilton	...	...	...	...
Greenbushes ...	82	5	44	4
Greenfields ...	96	3	93	6
Glenorchy ...	86	3	37	3
Williams ...	29	2	...	...
Arthur	46	2	...	...
Darkan	15	1	10	1
Wagin	13	2	67	4
Glencove ...	34	5	120	6
Dyliabing ...	35	4	101	4
Katanning ...	14	2	93	5
Kojonup ...	50	5	95	3
Broomehill ...	43	4	119	4
Sunnyside ...	68	4	94	5
Talbot House ...	47	2	128	4
Woodyarrup ...	91	5	116	4
Mianelup ...	79	4	178	6
Cranbrook ...	...	...	...	...
Toolbrunup ...	88	5	81	4
Tambellup ...	40	7	87	7
Blackwattle ...	...	...	...	...
Woogenellup ...	134	5	...	...
Mt. Barker ...	159	9	61	7
Kendenup ...	424	16	52	5
St. Werburgh's...	161	7	102	8
Forest Hill ...	178	10	175	11
Denmark ...	227	5	108	5
Grasmere ...	175	10	96	10
Albany	165	10	99	10
King River ...	144	4	150	4
Point King ...	101	8	...	...
Breaksea ...	134	14	80	11
Cape Riche ...	97	5	237	4
Cherilallup ...	35	2	106	2
Pallinup ...	96	4	96	3
Bremer Bay ...	70	6	214	5
Peppermint Grove	90	10	219	8
Jarramongup ...	80	2	223	4

RAINFALL—*continued.*

STATIONS.	NOVEMBER.		DECEMBER.		STATIONS.	NOVEMBER.		DECEMBER.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.		No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN DIVISION:					EASTERN—*contd.*				
Dural	4	1	46	3	Koorarawalyee ...	31	2	91	2
Wiluna	10	1	57	4	Karalee	95	3	125	2
Gum Creek ...	46	1	75	1	Yellowdine ...	84	3	170	3
Mt. Sir Samuel ...	Nil	...	27	3	Southern Cross ...	59	3	88	1
Lawlers	1	1	234	8	Parker's Range ...	29	5	...	...
Leinster G.M. ...	Nil	...	116	1	Parker's Road ...	48	1	140	1
Darda	...	...	...	...	Mt. Jackson ...	44	2	124	3
Duketon ...	3	1	42	5	Bodallin ...	...	...	...	...
Mt. Leonora ...	Nil	...	59	4	Burracoppin ...	4	1	110	1
Mt. Malcolm ...	Nil	...	75	4	Kellerberrin ...	10	1	169	5
Mt. Morgans ...	Nil	...	52	1	Merriden ...	23	2	176	3
Burtville ...	...	...	...	...	Nangeenan ...	11	1	154	3
Laverton ...	6	1	168	6	Mangowine ...	Nil	...	120	3
Murrin Murrin ...	Nil	...	12	2	Wattoning ...	...	...	...	...
Yundamindera ...	Nil	...	Nil	...	Noongarin ...	...	...	15[illegible]	2
Tampa	Nil	...	47	2					
Kookynie ...	Nil	...	83	6					
Niagara	Nil	...	93	3	EUCLA DIVISION:				
Yerilla	Nil	...	70	5					
Edjudina ...	Nil	...	78	5	Ravensthorpe ...	78	8	216	8
Menzies	Nil	...	57	5	Coconarup ...	40	4	159	4
Mulline	8	2	31	5	Hopetoun ...	120	6	197	3
Waverley ...	10	2	64	5	Fanny's Cove ...	40	...	...	...
Goongarrie ...	Nil	...	127	4	Park Farm ...	39	4	103	3
Mulwarrie ...	Nil	...	221	5	Esperance ...	157	5	195	3
Bardoc	Nil	...	84	6	Gibson's Soak ...	43	3	181	5
Broad Arrow ...	50	1	93	6	30-Mile Condenser	29	3	125	3
Kurnalpi ...	20	1	91	2	Swan Lagoon ...	...	...	131	3
Bulong	Nil	...	26	2	Grass Patch ...	16	1	...	...
Kanowna ...	Nil	...	5	1	Myrup	93	3	180	4
Kalgoorlie ...	7	1	31	3	Lynburn ...	45	3	...	...
Coolgardie ...	70	2	81	5	Boyatup	149	5	249	3
Burbanks ...	23	1	50	5	Middle Island ...	...	...	..	...
Woolubar ...	12	2	55	4	Point Malcolm ...	30	2	...	...
Widgiemooltha ...	23	3	14	3	Israelite Bay ...	9	2	63	5
50-Mile Tank ...	6	1	Nil	...	Balbinia	12	2	3	1
Waterdale ...	6	1	24	2	Frazer Range ...	Nil	...	...	...
Norseman ...	55	4	50	4	Balladonia ...	6	1	9	1
Lake View ...	160	4	58	2	Southern Hills ...	17	1	...	...
Bulla Bulling ...	44	3	59	4	Eyre	34	2	3	1
Boondi	6	3	74	3	Mundrabillia ...	...	...	...	...
Boorabbin ...	7	1	102	3	Eucla	16	2	Nil	...

The Observatory, Perth,
10th January, 1905.

W. E. COOKE,
Government Astronomer.

By Authority: WM. ALFRED WATSON, Government Printer, Perth.

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Department of Agriculture

OF

WESTERN AUSTRALIA.

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NOTES.

Editor's Farewell.—It is an old saying that persons should "practice what they preach." This is being carried out by ourselves, for, after holding office for between four and five years in the Department of Agriculture, such useful knowledge has been gained and object lessons learnt that we have determined to follow the advice we have given so often in the Journal and put our knowledge to a practical use by settling on the land. We have to thank our readers for the assistance given us, in submitting questions of interest, which often proved the means of enabling us to publish valuable information, that but for the query might not have been brought to light. As a parting word of advice we would strongly urge all those who are looking to the land for a living to make themselves better acquainted with the Department of Agriculture, its fund of information available, and the lessons to be learnt from a perusal of its records. The officers of the Department are ready at all times to give such information as is in their power for the benefit of the settler, their only complaint being that, when anything goes wrong, matters are allowed to remain for some time before applying for advice, and the Department is blamed for not preventing occurrences that they were kept in ignorance of. This is not as it should be. So soon as anything attracts the attention of the grower that he does not thoroughly understand, he should communicate at once with the Department of Agriculture, when every assistance possible will be promptly accorded. The settler, fruit-grower, farmer, or squatter has no better friend than the Department and its officers, who are always ready to give help and advice when needed.

NEW INSECT PEST DISCOVERED.—Miss Susie M. Daniel, a graduate student in agriculture and entomology in the University of California, has made an interesting insect discovery which may prove of great value to fruit-growers in California. She has found a new species of Thysanoptera, or what is commonly known as "thrips." This winged insect of the butterfly type is supposed to account for the hard brown spots on the oranges in Southern California, and steps will be taken to investigate this and also to determine ways to remedy the trouble by fighting the insect.

SOUTH AUSTRALIAN EXHIBITION.—Under the auspices of the Chamber of Manufacturers, an exhibition is being held in the Jubilee Exhibition Building, Adelaide, South Australia, during the months of March and April. The West Australian Government have decided to be represented, and Mr. P. Wicken, of the Department of Agriculture, has been appointed to get together an exhibit and take it to Adelaide, and is now busily engaged in collecting items of interest, so as to make a representative West Australian Court. The exhibits will comprise agriculture, mining, and timber, and Mr. Wicken will be glad to hear from anyone who has any article of special or general interest which they would lend for the purposes of this exhibition.

EXPERIMENTAL FARMS.—In the *Government Gazette* of the 3rd inst. a notice appears that two areas of about 6,000 acres each in the Nelson district have been set apart as experimental farms. The following are the boundaries of the two reserves:—"Nelson (Warren River).—Bounded on the North and West by lines starting from a point situate about one mile West from the junction of the Warren River and Big Hill Brook, and extending East 240 chains and South 250 chains; the opposite boundaries being parallel and equal. Nelson (Gardner River).—Bounded by lines starting from the sea coast at the left bank of the Gardner River and extending North-Eastward along said bank about 4½ miles; thence East about 100 chains and South to the sea coast; thence Westward along the sea coast to the starting point. Excluding Nelson locations 1226, 1234, and 1235."

PITS AND DRINKING POOLS.—To neglect the cleaning out of pits and drinking pools till they are filled with mud and the approach to them is a quagmire, through the trampling of cattle, is not a good practice, and advantage should be taken of periods, when other work is not pressing, for mudding these places out, and thus insure a good watering place for the summer. The mud from pools and watering places is generally too rank for use straight away, but if it is wheeled into a heap and allowed to remain till the water has drained away, then it may be turned once or twice and have fresh lime

Flock of Bronze Turkeys at Newmarracarra.

mixed with it, which corrects the acidity. By treating the material in this way and letting it remain for some time, a useful heap of stuff is obtained, which may be spread on the land with advantage. Besides this a supply of pure drinking water is insured for the cattle in the summer, and if more trouble were taken to keep drinking pools clear of mud so that they would hold more water, we should hear fewer complaints about the shortage of this essential commodity in seasons of drought.

SHOULD FARMERS KEEP BOOKS?—Of course they should, and those who have never made a start might begin at once. In the old days, before education had made its power felt in the country, we know that many really well-to-do farmers were not equal to book-keeping, and the method many of them had of keeping accounts was distinctly ingenious, but understood by no one but themselves. The old order has changed now, however. Banking accounts are general, and it is the common custom to pay by cheque, instead of notes or hard cash. In fact, there is no good excuse for anyone muddling along, and every farmer should keep books showing his receipts and payments, in order that he can tell at any time how he stands. In many cases failure might have been averted if this had been done, and we have known men who have gone on losing money in some particular direction, but in sublime ignorance of the fact, simply because they had no system of book-keeping. Books and figures act as a safeguard against rash speculation; they show where operations may be extended and where leakages can be stopped. In short, they are the rudder of the farm ship, by which a straight course can be steered.

TURKEY-RAISING.—The raising of Turkeys is an industry that is being extensively entered into in Western Australia, and is proving very profitable to those engaged in it. The birds are easily reared, and if allowed sufficient country for them to ramble over they will feed themselves, and can be brought to a marketable condition at very little expense, and the price obtained is always remunerative. Some excellent stud birds are now in this State, no expense having been spared by breeders in obtaining the best birds of the bronze varieties from U.S.A. and elsewhere. Anyone engaged in this industry should pay particular attention to securing a good gobbler, as he will soon improve the quality of the flock, whereas with an inferior bird the flock soon deteriorates, and it is only the best birds that obtain the highest prices, and they cost no more to rear than the inferior ones. The accompanying illustration show a flock of Bronze turkeys at Mr. McKenzie Grant's Newmarracarra Estate, in the Geraldton district, where turkey-raising has been extensively entered upon. The birds are allowed to roam all over the country and to lay their eggs where they like, and in due course they return home with their young ones, the losses being very few. During the past season about 1,000 young turkeys have been raised on this estate.

FERTILITY OF EGGS.—Infertility and lack of vitality in the egg germ, especially the latter, is the greatest of present-day poultry problems. The West Virginia Experimental Station has been investigating this matter. In the spring of 1900 about 5 per cent. of the eggs produced by the fowls of the station were infertile; of the fertile eggs only about 65 per cent. would hatch, and the chickens produced from them were not strong and vigorous. The eggs were laid principally by pullets that had been used during the winter in various experiments concerning egg-production. The fowls had been kept in flocks of 20 in laying houses, and had been fed quite heavily on a well-balanced ration. Whole grain was scattered in the litter in the houses at night, and in addition to the exercise of scratching for their grain, each flock was allowed a run of 15ft. wide by 100ft. long. The hens and cocks were apparently vigorous, and numerous eggs were obtained, but they would not hatch well. The experiments began on March 11, when a flock of white Leghorn fowls was selected by means of which to study the influence of unrestricted range upon the hatching power of eggs. One-half of the flock was allowed to remain undisturbed in the house and yard to which it was accustomed, while the remainder of the flock was permitted to run at large. Both lots of fowls were fed the same grain ration; but it was observed that the fowls running at large did not consume so much food as did those confined, which was probably due to the larger number of bugs and worms they were able to find. Both lots of fowls received ground fresh meat and bone, and those confined had an abundance of green food. About six weeks after the experiment began, eggs were collected from each lot of fowls, marked, placed in the same incubator, and hatched side by side. Note the result:—Of the eggs laid by hens that had free range, 8·5 per cent. were taken out on the seventh day, leaving 91·5 per cent. fertile eggs. Of these 83 per cent. hatched. Of the eggs laid by the hens in confinement, 24·4 per cent. were thrown out on the seventh day on account of being infertile, leaving 75·6 per cent. of the eggs. Of these 67·5 per cent. hatched. The tests, therefore, showed that about three times as many of the eggs laid by the confined hens were infertile as of the hens that had free range, and that the fertile eggs from the confined hens did not hatch so well as in the case of the eggs from fowls having free range. Of the eggs first placed in incubators, 76 per cent. laid by hens having free range hatched, and only 51 per cent. of the eggs laid by confined hens hatched.

COPPER AS A BACTERICIDE.—One of the greatest evils with which man has to combat in the tropics is impure water, which is more or less directly the cause of many ills, including cholera, typhoid, malarial and yellow fevers, and various diseases of the intestinal and digestive organs; and a simple and effectual method of purifying filthy water and killing its contained germs has long been wanted. We are glad to hear, therefore, that a reliable and perfectly harmless purifier has been discovered by Dr. George

Moore, of the U.S.A. Department of Agriculture, in copper sulphate, commonly known as "blue stone," or bue vitriol. Dr. Moore's statements are backed by the United States Government. The copper solution used is so diluted that it cannot injure a child, and yet so "active" that it destroys virulent cholera germs in four or five hours. Lakes and reservoirs in America, so filthy and putrid that "horses refused it at the street watering troughs, and dogs fled from it," were rendered perfectly sweet and clear by Dr. Moore's method. "The only apparatus required was some coarse sacks and a rowboat. About 200lbs. of the blue vitriol were placed in the sacks and hung from the stern of the boat. Then the boat was rowed up and down, backward and forward across the reservoir for several hours, covering every part of the surface in order that the copper should be evenly distributed. . . . At the end of 24 hours the greenish colour began to disappear. . . . At the end of the third day the water was clear, sweet, and completely cured of the disagreeable smell and taste. . . . To make sure the copper had not poisoned the water, Dr. Moore tested it a few hours after the dose was applied, and found no trace of the copper remaining." In that reservoir a rather strong dose of one part copper to 4,000,000 water was used; as a rule the dose used is one part copper to 10,000,000 to 50,000,000 parts water. "Who would have imagined," writes Mr. Gilbert Grosvenor in the *Century*," that a pinch of these crystals in the water tank would kill any typhoid germs lurking there; that it would exterminate malaria-and-yellow-fever-carrying mosquitoes in stagnant pools and swamps by destroying the vegetable organisms on which the mosquito larvæ feed; that it would, in a few hours, make the water of an evil smelling reservoir, containing billions of gallons of water, clear and sweet, that while it kills the bacteria it does not make the drinking water poisonous or injurious to the human system." The discovery is a most important one, and copper will probably be extensively used for this purpose in the near future.

FRUIT FLY PARASITE.—It is certainly gratifying to learn that the action of the Government of this State in sending out Mr. G. Compere, the State entomologist, to search for the parasite of the fruit fly has been the means of awakening other countries to the possibility of combating with this pest. The Californian Government has joined this State in sharing the expenses of Mr. G. Compere's trip. A writer in one of the South African papers thus refers to the steps taken by that country:—"Mr. G. Compere's travels have been closely followed by official entomologists in South Africa (says a writer in a contemporary of that country), for, however little faith any may have had in the ultimate success of his quest, it was fully realised that, should he discover parasites of importance, the countries of South Africa might benefit greatly. The first intimation that he had found parasites came from Australian papers, in which was made public a brief cable despatch from Brazil, announcing the fact. As soon as the number of the JOURNAL containing the full report was received, and it was seen that the discoveries were evidently of considerable promise, Mr. Claude Fuller, the Natal entomologist, suggested to the writer that some joint action should be taken by the several English colonies of South Africa, and I agreed with him that such action should be taken without delay. The Natal entomologist, and I believe ourselves justified in giving full credence to Mr. Compere's statements that *Ceratitis capitata* exists in Brazil, and that it is not a pest there. Neither of us, however, share Mr. Compere's optimism to the extent of being confident that his finds will anywhere effectively suppress the fruit-fly pest. We think there is some chance that, even if all is done that can be done to introduce and establish the checks in South Africa, they may fail to prove of any practical value. But, on the other hand, so vast would be the benefits if Mr. Compere's prophecy were fulfilled, and so good, at least, are the chances of materially improving our conditions as regards the pest, that we believe our Government should lose no time in making a determined effort to get the checks established here. The Eastern Province entomologist and the Orange River Colony entomologist agree with us, but the Transvaal entomologist is of opinion that we should postpone action until Mr. Compere proves the checks either a success or failure in Western Australia. The writer is much opposed to delay, for it may take several years of experience to demonstrate in Western Australia whether or not the checks are of material advantage, and even if a partial or complete failure follows there, we in South Africa may not be satisfied that attempts to establish them here would not be fully warranted. Despite my previous scepticism that efficient natural enemies exist, and despite my present fears that the checks found may by no means fulfil Mr. Compere's expectations, I am firmly of opinion that it would be wrong for the South African colonies to delay a single season. Mr. C. P. Lounsbury, Cape Government entomologist, and Mr. Claude Fuller, Government entomologist of Natal, sailed by the Kenilworth Castle for England recently. From the Homeland they will proceed to South America on a scientific mission in quest of the parasites. Our contemporary, in an extensive article, compliments Mr. Compere on his able work. The writer refers to the Western Australian entomologist as "a master collector and observer of insects."

WINE FERMENTATION.

SULPHUR AS A CONTROLLING AGENT.

By A. DESPEISSIS.

Vintage is close at hand, and within a few days of writing these notes our fermenting sheds will present a scene of life and activity.

Wine-makers will do well to peruse the few pages devoted to that subject in the second edition of the *Handbook of Viticulture,* issued by the Department of Agriculture. Therein I have given prominence to the influence of temperature on fermentation. Given sound grapes and clean vessels, a proper observation of the temperatures within which grape juice is converted into wine will ensure soundness and good keeping quality to the new vintage.

In cool countries that transformation goes on without trouble; in hotter ones, a rise in the temperature beyond limits favourable to the elliptic yeast *(Saccharomyees ellipsoideus),* which is the wine ferment proper, will bring about accidents which are easier averted than remedied.

Ever since Pasteur, and after him the scientists who have worked out the mysteries that enshrouded the question of "Fermentation," have demonstrated that by regulating the temperature, one particular micro-organism can be encouraged to the exclusion of others also present within the mass in the fermenting vat, the question of how best to secure that requisite temperature has been one of paramount interest to brewers and distillers, as well as wine-makers.

The same laws which govern the manufacture of beer, spirits, or dry wine also hold good in dairies, in butter, and in cheese factories.

Those temperatures most favourable for the making of any of the articles turned out in the above-mentioned factories are called

THE OPTIMA TEMPERATURES.

In wine-making they range from 75° to 95° F. (24°–35°C). Below 75° F. the elliptic yeast is sluggish and languid. It has to combat other kinds of yeast which are known as "wild levures," notably the *S. pasteurianus* and the *S. apiculatus*; above 95° it goes through a feverish period and is left sickly and weakened, to be finally mastered by *mycoderma aceti,* which turns spirit into vinegar, and also by the micro-organisers, which are the active agents of those diseases which make the wine sour-sweet (lactic or mannitic fermentation), ropy, scuddy, or bitter.

The ideal temperature in wine-making is one which as near as possible marks 86° F. (30° C.) on the thermometer.

HOW TO CONTROL TEMPERATURES.

In countries such as Australia, South Africa, California, Algeria, and Spain, where, in the warmer localities, temperatures range high during vintage time, wine-making has for generations past been conducted under difficulties which have prompted the ingenuity of vineyard proprietors to using all kinds and manner of devices in order to turn out sound wines.

Science, which the average "practical man"—very often amongst the most unpractical when difficulties stand in the way—has again proffered a helping hand, and shown the way out of the mire.

Once it had been shown that the control of proper temperatures averted disastrous accidents and insured success, a variety of methods were employed in order to achieve the desired result.

To better control temperatures, some provided costly fermenting houses, provided with double walls and elaborate contrivances for shutting out the hot external air. They were discarded when it was shown that open-air fermentation, under shady trees or in bough sheds, were quite as satisfactory, if not more so.

Others also, mostly in Algeria and Tunis, recommended keeping the sun-heated grapes over night on cool and airy terraces. This proved a cumbersome and impracticable plan where a large vintage has to be vatted within a short season.

Others again favoured occasional pumping of the fermenting must from the bottom of the vat to the top again; or the use of enamelled iron vats in order to disperse the gradually-generated heat, and also, with the same object, smaller vats instead of large ones. All these methods, although useful at times, often proved ineffective.

Nowadays, the two methods more generally adopted to cool the fermenting must are the one "physical" and the other "chemical."

The physical method more generally used is the one which consists in lowering the degree of temperature of the must by means of cool water. With that object in view, the stream of water is made to run over the wine, which circulates through thin tubes, or conversely, the water is made to flow through a thin spiral tube immersed in the wine. The immerged refrigerating apparatus employed is called an "atemporator." That method presents several objections. The supply of cool water may be deficient, too costly to provide, or the price of the apparatus may be rather heavy, or it may not prove an easy one to keep sweet and clean. Within close proximity to populous townships or refrigerating works, where blocks of ice may be obtained at a reasonable price, that method proves one of the most practical for lowering the temperature of the fermenting mass.

For some years past, refrigeration by means of ice has been the the one which has proved the most acceptable to wine makers of the Swan who are within easy distance of Perth. They can obtain the requisite ice from the Government refrigerating works at the price of 3s. per block of about 130lbs., and the cost of freight by rail is not a bar to its use.

It is reckoned that it takes seven to eight lbs. of ice to lower by 1°C. or 1·8°F. every 100 gals. of must in fermentation.

Another method adopted by some for the same purpose is the one which consists in feeding the fermenting vat by means of gradual additions of freshly-drawn grape juice. That method which may answer for common wines is not conducive to quality. Apart from these methods of controlling the temperature in the fermenting mass, which are based on physical laws, there are chemical methods as well. Of these, one above all is the most practical, the cheapest, and the less likely to be injurious to health. It is the only one I will mention.

SULPHUR A COOLER OF FERMENTATION.

The method presents in itself nothing radically new. For ages past sulphur has been used more or less freely, and certainly beneficially, in wine cellars. It is only within the last ten or twelve years that its action on the fermenting grape juice has been well understood, and only within the last four or five years that methods have been evolved whereby its dosing has been done with any degree of precision and accuracy.

Freshly-pressed grape juice is alive with germs and micro-organisms, some of which are useful, others injurious.

The micro-organisms considered useful are those yeasts or levures which transform a given amount of grape sugar into a maximum corresponding amount of pure alcohol; the others, which are considered noxious, seriously interfere with the course of fermentation, and leave in the wine residues which impair its quality and endanger its good-keeping qualities.

An ideal method of controlling fermentation, and one suggested by Pasteur, consists in sterilising or ridding the grape juice of all its forms of living germs and sowing it in due course with specially-selected levures or yeast. Heat is in most cases used as the readiest agent of sterilisation.

In practice that method which appeals to one as based on sound reasoning, is found impracticable on the score of cost and the trouble entailed by the necessary handling. What heat can do when applied through specially-designed apparatus it is found that sulphur fumes can also achieve at a fraction of the cost and with hardly any trouble whatever. The dose necessary to bring about definite results cannot be prescribed with any degree of certainty. It must perforce vary with the temperature of the air in the fermenting shed, the degree of heat of the grapes at the time of starting fermentation, the capacity and power of radiating heat of the fermenting vat.

For many years the main objection to using sulphur fumes has been the difficulty of dosing it with some amount of precision.

It is easy enough to weigh a definite quantity of sulphur, which is an inert substance. It is also known that when sulphur is burnt it is changed into sulphur fumes or sulphurous acid, and that one part by weight of sulphur so burnt is transformed into two parts of sulphurous acid, but the difficulty is to bring about the absorption of those fumes without loss. For that purpose several appliances have been devised, but their use is attended with more or less waste.

Another alternative is to use measured quantities of liquified sulphurous acid. On a small scale this substance is, however, out of the question, as it is contained in steel shells, and necessitates specially-constructed apparatus.

More handy preparations are known in commerce as "sulphitartre" and "bisulphite of potash." The sulphitartre was patented some ten years ago by two French œnologues, Messrs. Gladysz and Gastine, and is prepared by acting sulphur fumes on the tartar of wine lees. This tartar is the result of the combination of bisulphite of potash and of lime and of tartaric acid. The sulphur combines in definite proportions with it, viz., about 6 per cent. with the tartrates, or 60 grammes of sulphurous acid in 1 litre of sulphitartre. When used during fermentation these tartrates gradually recrystallise and precipitate, and the sulphurous acid is given off. The tartar in settling down at the bottom of the wine-vessel, carries down along with it impurities, thus achieving a kind of fining or clarifying of the wine.

BISULPHITE OF POTASH.

Another chemical substance, however, now more commonly used and more readily procurable is one known to chemists as "bisulphite of potash." It contains half its weight of sulphurous acid. That substance is easily kept and handled, and moreover its cost is moderate. It should be kept in closed boxes or vessels.

Used in fairly heavy doses, it paralyses the ferments and other micro-organisms present in the must, for a time which is somewhat variable. As the sulphur fumes are given off life reappears in the must, but in the meantime the object sought for has been attained, *i.e.*, the clarification of the must has taken place, or the temperature has been reduced to a degree which vouchsafes a healthy fermentation.

Employed in less heavy doses, the course of fermentation can be directed with ease and safety until all the grape-sugar has been transformed into alcohol.

For *white wine* it is advisable to add the bisulphite of potash in one single dose of 2ozs. to 6½ozs. per 100 gallons (1¼ to 45 grammes per hectol.). After 18 to 24 hours the clear grape-juice is drawn from over the slimy mud which has accumulated at the bottom of the vat, and is set to ferment in another vat or in casks, care being taken to let as much air as possible in that grape-juice whilst so doing, in order to expel any surplus sulphurous acid and let in a sufficiency of oxygen to promote fermentation.

A few gallons of must in full fermentation, to act as a starter, saves time, and is to be recommended.

For *red wines* one proceeds differently, as there is no occasion to draw the clear grape-must from over the skins and pips.

The dose of bisulphite of potash, instead of being put in in one lump, is split up into smaller doses, which are added to the crushed grapes from time to time as required.

The dose of the chemical used varies for red wine between 7 to 12ozs. per ton of crushed grapes (20–35 grammes per 100 kilos.) in three doses of, say, 2, 2, and 4ozs. to 2, 4, and 6ozs. each time. A good way is to dissolve the chemical salt in warm water and sprinkle the first dose on the crushed grapes whilst it is being vatted. This will somewhat delay the starting of fermentation, which, when well established, will receive the second dose of bisulphite. That dose will be added to a portion of the fermenting must drawn into a tub and pumped back over the top of the mass. That addition will likewise slow down the fermentation. When it has properly recovered, and shows indications of boiling again, the third addition is similarly made.

The use of the bisulphite will steady the tumultuous fermentation and regulate the generation of heat during the process to an extent which will prevent a rise of the temperature to any dangerous degree, and give time to the heat produced to dissipate.

Contrary to what one would expect, the colouring matter which, whilst the sulphurous acid is permeating the fermenting liquid is pale, recovers its intensity when it is rid of it, and becomes more brilliant. An experiment carried on with two lots of grape-juice fermented, one lot under the influence of sulphurous acid, and the other with the help of an atemporator, both produced dry and well-fermented wines.

The sulphited sample, however, soon became brilliant, showed a bright colour, and on tasting proved superior as regards quality, and possessed of a refreshing fruity taste; whilst the other sample, although sound and good, was not so forward, and was somewhat dull and lacking in condition, and rather raw to the taste.

For the past three or four years this method of fermentation has been used with increasing favour in France and in Algeria.

The vintage before last, I tried it in a tentative way in Western Australia, and the result was so satisfactory that I made last year over 4,000 gallons of white wine according to the method described. Unlike that of previous seasons, the wine has been clear and in good condition from the time fermentation ceased; it never looked scuddy, and is keeping and maturing as well as one could wish.

CALF REARING.

(Continued.)

By R. E. WEIR, M.R.C.V.S.

NAVEL ILL.—This may be described as an inflammation of the umbilical cord, which may be torn off close to the abdomen, or otherwise injured about the time of birth.

The complaint is not an uncommon one amongst dairy-fed calves, for the reason that care and cleanliness are not always exercised or even considered an essential to the animal's welfare.

For a few days after birth the lacerated raw surface of the cord is liable to become soiled, and should any matter of a poisonous nature be present and become absorbed, injury is likely to be caused of a serious nature. Foreign bodies are also prone to adhere to the cord, and should they become embedded within the tissues, inflammation is practically sure to supervene. Cold and wet are also occasionally responsible for this complaint.

The protruding end of the cord instead of drying up and withering, becomes hard, swollen and painful to the touch. Signs of fever may also be present and the animal may stand with its back slightly arched. In the event of the disease being confined to the outer tissues, a favourable recovery is likely to be made, but should the inflammation extend along the course of the cord or affect the organs or membranes internally, the resulting abscesses are likely to terminate in blood-poisoning and death.

Necessary treatment should be directed towards reducing the swelling by means of hot fomentations, and frequent applications are necessary until the inflammation has subsided. Pus may form within the enlargement, and lancing will then have to be resorted to—afterwards dressing with a solution of carbolic. Cleanliness and disinfectants are essentials so as to avoid any poisonous matter becoming transferred to other animals. The invalid's strength requires to be sustained with frequent supplies of milk, and costiveness avoided with castor oil.

(To be continued.)

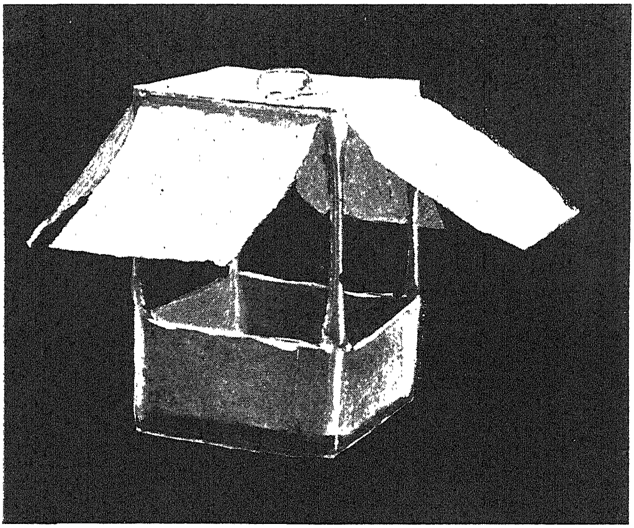

Fig. 1.—Showing how to make a shaded drinking trough, out of a kerosene tin, for fowls.

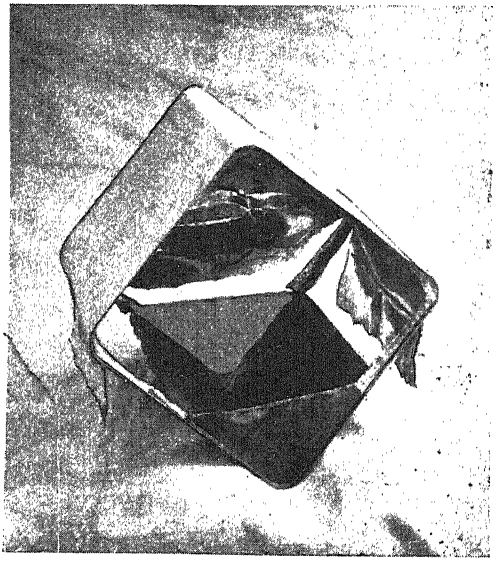

Fig. 2.—Showing another way of cutting a kerosene tin, to make a shaded trough, for fowls.

POULTRY NOTES.

By FRANK H. ROBERTSON.

DRINKING VESSELS FOR FOWLS.

Herewith are illustrations of drinking vessels for fowls, as mentioned in last month's notes. The first shows a kerosene tin cut with an ordinary tin opener in such a manner that the water is protected from the sun by the sides of the tin acting as verandahs all round; all sharp edges are hammered down to guard the fowls' wattles against being cut or scratched. To prevent the tin rusting, a coating of the bottom with tar inside and out is advisable, and if the remainder of the outside is painted—coated with an indeliblo or a good permanent lime wash—its appearance is greatly improved. If there is a risk of chickens being drowned the body of the tin can be cut much lower, or, if preferred, a stone or half a brick can remain in the vessel, thus giving the chickens a means of jumping out of the tin. But the careful poultry keeper does not as a rule allow young chickens and adult fowls to run together.

Although this drinking vessel is made to shade the water from the sun, still that must not be depended on in hot weather; it should be kept under shelter of some sort—the best is under the shade of a tree. To leave it standing out quite unprotected in an open yard would result in the water getting very warm, but if placed under a shady growing bush the wind blows over the water and is the best way of keeping it cool.

Illustration No. 2 shows another mode of cutting a kerosene tin, forming a V-shaped drinking trough. The fowls can drink only from the front; the openings at the back and sides are made to allow a current of air over the water to keep it cool. Bricks or blocks of wood must be placed at each side to enable it to stand upright. The advantages of this trough over the square-cut one are that the sloping sides make it safer for chickens, and in districts where water is a consideration the fowls can empty it to almost the last drop.

BOWEL TROUBLE WITH FOWLS.

One of the commonest complaints that poultry are subject to is that which affects the intestines, producing severe diarrhœa and many deaths. It is unfortunately very prevalent at this time of the year, especially in yards where the fowls are not properly looked after. The general symptoms are want of appetite, dullness of eye, ruffled plumage, excessive thirst, and a strong inclination for the bird to remain huddled up in a shady corner. The symptoms to be watched for most are the droppings, which are of a greenish, slimy nature, turning yellowish as the disease advances.

When feeding the fowls, if any do not come to the feeder's call, they should be at once taken in hand, and placed in a comfortable coop where the birds can be watched, and the symptoms better detected; and if found as above described, do not give them any hard food, and if the crop is already full, none should be given until it is empty. Do not commit the common error of forcing food down a sick fowl's gullet; this should only be done to prevent a bird from starving, while being under medical treatment; and for this purpose beaten up egg will be found the most suitable, administered with a teaspoon, or, better still, by using a small feeder such as a patent ink pen filler. If the fowl will eat, only light food should be given, such as bread crumbs soaked in milk or boiled rice.

A good remedy is to give a strong dose of olive oil, followed two or three hours afterwards by six drops of chlorodyne every three hours in a dessert spoonful of water. I have also known very severe cases cured with the following simple remedy, viz.:—Equal parts of cayenne pepper, mustard, and ground ginger, mixed into pills with butter and given very freely. Some of the causes of this complaint are over-crowding and a general neglect of sanitary arrangements, such as eating their food off ground tainted with their own excreta, drinking stagnant or sunburnt water, eating putrid meat, or sour food of any description.

As precautions against a recurrence of the malady it is necessary, wherever practicable, to adopt stringent disinfecting of all houses by means of a strong carbolic spray, and the ground should be strewn with unslacked lime and then watered. All droppings should be removed daily, and strict attention paid to sanitary arrangements, making sure that no stagnant or refuse water is allowed to remain about the yards, to which the fowls are likely to have access.

POST MORTEM EXAMINATIONS.

All Poultry keepers who take an interest in the welfare of their flocks should make themselves acquainted with the internal organs of healthy fowls, so that when one dies they may be able to form an idea as to the probable cause, and with this end in view it is always advisable when opportunities occur to make one's self thoroughly acquainted with the viscera of birds in perfect health, so that when a bird is opened up, which has died from disease, the affected parts are at once noticeable by comparison with organs in normal condition. In making a *post mortem* examination, if the legs and wings are first removed it will facilitate operations, then pluck all feathers from the abdomen, then with a scissors or sharp knife cut through the ribs on both sides and round the stern, taking care not to penetrate the intestines (the fowl is of course resting on its back), the whole of the breast can thus easily be turned over towards the head of the bird, exposing to view the internal organs. The first seen are the two lobes of the liver, which in perfect health are of a dark chocolate colour; underneath the liver is seen the gall bladder, the gizzard and heart are also exposed to view; these organs are then each separately removed, then can be seen the lungs on each side attached to the ribs, which in perfect health are of a bright salmon colour; the kidneys are of a duller colour, of soft texture, and extend along the spine. The testicles, of a dull whitish colour, are in the cavity near the kidneys, and vary in size according to the age of the bird and season of the year. In following the digestive organs from the beak—food enters the œsophagus or gullet situated behind the larynx, thence to the crop, where it remains some time and gradually passes out along the lower portion of the gullet to a small stomach called the succentric ventricle or proventriculus, the food there mixes with gastric-juices and passes on to the gizzard, which it closely adjoins, there the grinding of the food takes place by means of the grit which is so essential to the good health of poultry. From the gizzard the pulped food now completes its digestion and traverses a long course through the various intestines, the most noticeable of which is first the duodenum, then the small intestine attached to a membrane termed the mesentery, the cacea are the two terminal blind guts, the rectum is the final passage from which the fæces are discharged into a cavity called the cloaca prior to their final exit through the anus. The organs of respiration are of course quite distinct, on opening a fowls beak the first orifice seen is the larynx, which is the entrance to the trachea or wind-pipe, which terminates in two smaller tubes communicating with the lungs.

The egg-producing organs of the hen are an interesting study of themselves. The ovary is situated near the left kidney. The yolks of the eggs are first developed, forming a numerous cluster like a bunch of grapes, and as a yoke developes to maturity it drops from its pedicle and passes into the opening of the oviduct, and in passing through the passage it gathers round it the white or albumen in several separate layers, also forming the two white string-like appendages termed the chalzæ; the egg then enters a larger portion of the oviduct termed the uterus, which secretes a thick white fluid which surrounds the egg, becomes hard, and forms the shell. The egg in its course from the time the yolk drops into the oviduct is supposed to take from four to six hours to develop into the complete egg. Double yolk eggs are owing to two yolks ripening and dropping into the oviduct at the same time and traversing the oviduct together become enclosed in the same albumen and shell.

To diagnose disease, a careful examination of the whole of the viscera is requisite, a thorough knowledge of the appearance of the organs in perfect health being necessary. The intestines are very frequently diseased. In perfect health they are of a clear greyish-white colour, but if on opening up they are inflamed, the trouble is discovered, and is generally due to faulty feeding or some irritant picked up, causing severe inflamation of the intestines, accompanied by diarrhœa. The opening of the bowels is also the means of discovering worms. In addition to the living parasites observable by the naked eye, there are many very minute ones which require microscopical and bacteriological examinations to definitely diagnose. The gall bladder is often seen very much distended, and the liver coloured from its juices. When this is seen, serious trouble is present. The liver is subject to many complaints, and if congested is much enlarged, soft in texture, and filled with blood. Fatty degeneration of the liver is common, in which case it is shrunken, hard, and spotted with yellow. The internal organs of fowls are subject to many complaints other than those mentioned, but to go into them all thoroughly would be beyond the limits of notes such as these, which are merely to give the novice an idea as to how to proceed in the opening up of a fowl, and the appearance of the principal organs in a condition of health.

FORTHCOMING POULTRY SHOW.

The show of young poultry, which was so successfully held at Fremantle last year under the management of Mr. Cairns Candy, will this year be held at the Perth Town Hall on Friday and Saturday, 7th and 8th April, under the auspices of the newly-formed W.A. Young Poultry Society; Mr. Cairns Candy, secretary, and Mr. W. C. Byass, treasurer. As it is intended to hold an auction sale on the afternoon of the second day of the show, this should be a good opportunity for breeders of good stock to show and sell, and for buyers on the look out for stock birds for making an early start for the coming breeding season.

A VALUABLE IMPORTATION OF PEKIN DUCKS.

Duck-breeding is receiving great attention in this State, and I am pleased to hear that several importations have been made of high-class birds, which are very much required to improve the quality of our flocks. Our markets have, of late, been well supplied, but owing to the poor quality of the birds offered, the prices realised in the auction rooms have, in many instances, been disappointing to the grower. Breeders who want to get good prices for their stock must send in better and properly fattened birds.

With the object of supplying settlers and others with the right quality of birds, Mr. Chitty Baker, of this Department, has resigned his appointment as Editor of the JOURNAL and intends going in for duck raising, principally with the object of breeding first-class birds for stock purposes, and has lately imported from the yards of Mrs. Bosley Jenkins, of South Australia, two or three breeding pens of her Mammoth Pekins. I inspected these birds a few days ago and can safely say that they are a really magnificent lot, of great size, grand colour, and the true Pekin type throughout. Several of them have been champion prize winners at the principal shows in the

Eastern States, and from them should be bred stock that will greatly increase the size and quality of our flocks in this State. The Americans, after years of experiments with all classes of ducks, have come to the conclusion that the Pekin is absolutely the best, and we hope Mr. Baker will have good results from his plucky investment, and we heartily wish him every success in his new sphere of life.

PHOSPHATIC MANURES:

Their Use and Economical Application.

By F. L. FAULKNER.

Of *all* forms of artificial fertilizers practically only those supplying phosphates or "phosphoric acid" have, up to the present, received much attention in the hands of the Australian farmer. This is no doubt pretty well as it should be, for almost all experiments conducted to date tend to show "That, given a good and thorough form of cultivation, phosphates, and practically only phosphates, give a return that warrants their application." How long it will be before other manures (nitrogenous and potassic) will have to be added with the phosphatic is a question; but many instances may be cited in the Eastern States where manuring has been practised with phosphates only on the same land for upward of 15 years, and still they are giving good results, while nitrogenous and potassic have little effect.

Although phosphatic manures have been used so extensively in Australia for a number of years, and although it is a known fact that some forms of the manures are not suited to some kinds of soil, yet it is astonishing what a large number of farmers, when purchasing their manure, have but a very vague idea of whether it is a manure suited to their soil and conditions, and whether it is a cheap manure, or a cheap rubbish concocted to sell. The above is accountable for the fact that, although many farmers have decidedly beneficial results, yet others have little or no effect from a similar dressing of phosphate.

THE FORMS OF PHOSPHATE.

Practically all the phosphatic manures are in the form of calcium phosphate (phosphate of lime) or, in other words, phosphoric acid in combination with lime. Now, although they are practically all as phosphate of lime, yet there is a difference in form *in which this constituent is present* as well as *in the amount of* impurity contained with it. The phosphate of lime may be present in one or two of three forms known, respectively, as "water soluble," "weak acid" or "citric acid soluble," and "insoluble" or "soluble only in strong acid." They are also known as mono-, di-, and tri-calcic phosphates respectively, as one particle of phosphoric acid is in chemical combination with one, two, or three particles or atoms of lime.

From the above paragraph it will be noticed that the mono-calcic phosphate, or that containing the least lime in combination with the phosphoric acid, is the most soluble manure.

The di-calcic form, however, is soluble in any weak acids. It is generally present in conjunction with the water soluble form, and for all practical purposes may be called a soluble manure, as it is soluble in the weak acids of the soil and those secreted by the plant roots in their search for food.

All phosphatic manures then may be classified under three headings, or, more practically, under two headings, *i.e.*, soluble and insoluble.

All phosphates in their natural state are in the form of tri-calcic or insoluble phosphate, and any of them may, by treating with sulphuric acid, be converted into the soluble form. In this case the sulphuric acid combines with the excess of lime to form sulphate of lime or gypsum (which in itself is a valuable "indirect" manure on some soils); and the phosphoric acid, being denuded of some of its lime by the stronger sulphuric acid, is converted into the mono-calcic or soluble form.

In the case of a phosphate containing a large percentage of lime, however, the process is rendered less satisfactory and more expensive, as such a large quantity of sulphuric acid is required to convert the lime into gypsum before the phosphatic portion is affected. Thus it would not be practical to superphosphate basic slag or manures containing such a high percentage of lime.

The above paragraph constitutes a very brief description of the manufacture of soluble or superphosphates, as they are generally called.

Thus, amongst the forms of soluble phosphates, we have on the market:—"Bone Superphosphate," made from bones treated with sulphuric acid after being crushed; "Guano Super," or superphosphate made from a phosphatic guano. Much of this form of manure is being made in the Eastern States, the guano being found as a deposit on the coasts and on numerous small islands round the coast of Australia. In Western Australia a good deal of this guano is being put on the market, and, generally speaking, its analysis is good, but the phosphate is so far left untreated or in the insoluble form.

Mineral superphosphates such as Lawe's Superphosphate United Alkalie, Ohlendorf's, Japanese Super, etc., are manufactured from phosphatic rock in various forms that is found on the Continent, in Japan, America, etc., by pulverising the rock and treating with the sulphuric as above. These latter manures have come to be very generally used chiefly on account of their genuine cheapness.

Of the forms of insoluble manures we have a large and varied assortment, the chief of which are unsuperphosphated bone dust, bone char, and phosphatic guanos; Thomas' Phosphate Powder, and various other scrappy variously composed articles such as blood manures, leather scrappings, hair, dried flesh, fish, etc., etc.

Of all the above manures, soluble and insoluble, those supplying the phosphate in the soluble form have almost invariably given better results than any of the insoluble. This is no doubt a conclusion that would be expected by anyone with a little knowledge of plant physiology, as he would know that every particle of food taken up by the plant must be in solution- -that is in the form of a liquid.

From this, then, it will be plainly seen that for any plant food to be of use to the plant it must be capable of being dissolved by water or very weak acids. This, combined with the fact that in most parts of Australia we are blest with a sparse rainfall and a very short growing season, tends to give the results obtained from superphosphates almost invariably superior to those of the less soluble preparation.

In addition to this the soluble manures give satisfaction on almost any class of soil and in any climate. The insoluble manures, on the other hand, are none of them adapted to all sorts of soil and climate.

In the first place, in all cases where the rainfall is less than 18 inches the insoluble manures will almost always show an inferior return when compared with the soluble.

Secondly, all insoluble manures, and particularly those containing a large percentage of free lime, such as "Thomas' Phosphate," are unsuited for and very often show no result at all when used on land containing an excess or even only a sufficiency of lime.

Thomas phosphate, on the other hand, sometimes will give as good, and occasionally a better, crop than superphosphate. This result however, will only be obtained on new land that is cold, sour, and hungry, with a high natural acidity, or on land that is wet, peaty, and humid.

The reason for the above result is no doubt accounted for by the organic acids of the soil dissolving the non-water soluble phosphate, and the free lime in the manure in return neutralising the excessive acidity of the soil and so rendering it more mellow and friable.

Bone-dust, bone char, and phosphatic guanos, which for all practical purposes are the same in their form of phosphatic composition, are manures that will perhaps give as good a return for money expended as the superphosphates in wet climates, but they are undoubtedly inferior to the latter where the rainfall is under

20 inches. They are also very slow in their action on land that tends to become water-logged and cold.

These manures, however, often contain a small percentage of nitrogen in addition to their phosphate, and it is this that sometimes puts a crop treated with the insoluble manure ahead of the soluble.

It may be taken for granted, however, that, all else being equal, that water soluble phosphate will give a better return for money expended than the less soluble ones.

An argument often used in favour of bone-dust, etc., and against superphosphates, is that the former are more lasting. This is undoubtedly true, but this is an argument against and not for the bone-dust, when looked at in the right light. The very fact of its being a lasting manure is a sure sign of its inertness or incapability of being utilised by the plant but slowly. As we cannot have cake and eat it too, neither can we use phosphoric acid to grow crops and have it remain in the soil at the same time.

On the other hand, the phosphate supplied by the soluble manure is utilised to the full requirements of the plant (granted, of course, that it is supplied in sufficient quantity), and the balance, or that portion not utilised at once is safely stored up in the soil as is the case of the excessive balance of bone-dust. Whatever the form of phosphate used, there is no danger of loss other than by leaching and drainage, and this loss is very slight in any soil, except perhaps in an almost pure white sand with no subsoil other than sand.

On this latter form of soil, for any perennial plants at any rate, and perhaps for cereal culture, bone-dust, guano, or some less soluble manure, would be more economical, as there would be less danger of loss from leaching.

In purchasing manures it is always advisable to obtain quotes with the guaranteed analysis of several different manures in order to arrive at some conclusions as to where the cheapest manure can be obtained. It is also possible to form a very good idea as to which of the manures will suit the soil for which it is required the best.

In arriving at which is the cheapest manure to purchase, it is necessary to consider the analysis, not only in one manurial constituent, but in any that it may contain. In the case of a manure being composed of more than one manurial constituent, it is necessary, to arrive at the value of the manure, to estimate the value of all but one of them, placing on them what it known as their "unitary" value.

The approximate unitary values of the various manurial constituents, as quoted generally in Western Australia, are:—

Phosphate of Lime (soluble)	2s. 2d. to 2s. 6d.
Do. do. (insoluble)	1s. 9d. to 2s.
Nitrogen	15s. to 16s.
Potash	6s. to 7s.

The phosphate of lime, however, would be more nearly correct, as far as its actual value goes, if, with the insoluble at 1s. 9d., the soluble was put up to a value of 3s. Three shillings or over is near the value put on the soluble phosphate by authorities, with the insoluble based at 1s. 6d. to 2s. It must be concluded, then, in the face of all this that the soluble phosphate is, at the above quoted prices, the cheaper manure to purchase.

With the nitrogen and potash unitary values at 15s. to 16s. and 6s. to 7s. respectively they are dear elements at the price unless, of course, it has been seen that the land requires them.

As exemplary of the last few paragraphs, we will suppose that a manure is required by Mr. X. for a farm down the G.S.R. He gets quotes of manures from merchants as follows:—

Brand B—Quoted at £4 per ton, analyses: 40 per cent. phosphate of lime, water soluble.
,, A—Quoted at £7 per ton, analyses: 40 per cent. phosphate of lime, water soluble, and 4 per cent. nitrogen.
,, C—Quoted at £3 10s. per ton, analyses: 17 per cent. phosphoric acid, or equal to 39 per cent. phosphate of lime, insoluble.
,, D—Quoted at £3 17s. 6d. per ton, analyses: 36 per cent. phosphate of lime, water soluble.

When brought to a unitary basis, after deducting £3 from Brand A for the nitrogen contained in it, *i.e.*, 4 per cent. at 15s. = £3, we get the following:—

Brand A—40 per cent. at £7 less £3 = 2s. per unit.
,, B—40 ,, at £4 (sol.) = 2s. per unit.
,, C—39 ,, at £3 10s. = 1s. 9½d. per unit.
,, D—37 ,, at £3 17s. 6d. (sol.) = 2s. 1½d. per unit.

Thus Brand C is, from the unitary point of view, the cheaper manure, with A and B next at 2s.

Brand B, however, is decidedly the cheapest manure to buy out of all of them, for, while its unitary price is only 2½d. above C and the same as A, it is a soluble phosphate and so superior to either of them.

Even leaving out brand B and taking the soluble manure D at 2s. 1½d., it is a better manure to buy for most purposes, and particularly for any cereal crop, where the tendency of the climate is to dryness, than either A or C. Turning to the £3 charged for the 4 per cent. nitrogen in brand A, it is doubtful if this ingredient is worth the amount charged for it, and in any case, if it is thought desirable to add nitrogen to the land I think it is preferable, and certainly more reliable to use the soluble phosphate, and buy the nitrogen in the form of nitrate of soda or sulphate of ammonia.

The quantity of manure to apply per acre is a question that is worthy of a little more consideration by thinking farmers; and there is no doubt that as time goes on and people get more accustomed to using manures that the dressings applied will get heavier.

It is a common practice to apply dressings of manure as low as 70 or 80lbs., or even down to 50 or 60lbs. per acre.

With a little consideration one can imagine the absurdity of trying to distribute 56 or even 70lbs. of manure so that each grain of seed will get even a particle of it. My experience with this matter is that, although a crop manured with, say, 60lbs. of manure per acre may look nearly as good as a crop with 1½cwt., yet when the stripper is passed over it the latter will invariably beat the light manuring by several bushels.

Most farmers when experimenting in these matters draw their conclusions offhand from the standing crop, and seeing the crops to all outward appearances the same they do not trouble to complete the experiment.

Again, when the amount of phosphoric acid required in the formation of grain and straw is considered the absurdity of these small dressings is again revealed. For instance: roughly speaking, 1cwt. of average superphosphate supplies sufficient phosphate of lime for the growth of from a 18 to 20 bushel crop of wheat. Thus, by adding a half-cwt. dressing of this manure we are limiting our crop to 9 or 10 bushels to the acre. This is of course by supposing that the crop was capable of finding every particle the first season, which is not possible; and also at the same time supposing that there was not already some phosphate in the soil capable of being utilised. Now, although the latter supposition is never really the case, we know, both by experiments and by many analyses that have been taken, that phosphates are almost always very deficient in Australian soils; so that by adding, say, 60lbs. of manure and reaping a crop of 16 to 20 bushels, instead of improving the land and working it up into good heart we are making it poorer and tending to exhaust it in a constituent already deficient.

On the other hand, by the addition of 1½cwt. of superphosphate an excess of what is required is present (a condition of things that is necessary for the maximum crop to be obtained), and the unused balance, instead of being wasted, as so many farmers think, goes to form a surplus for future years, and if it is not cropped the following year will influence the grass crop in quantity and quality for years to come.

Do chemical fertilizers exhaust the soil? is a question very frequently put by those interested but not very fully enlightened. To this the answer is undoubtedly, No!

The reason for this question being put so frequently is no doubt that it is not looked at in its true light as a food and necessary constituent of plant growth, but as a sort of stimulant that forces the soil into handing its store of plant food over to the plant and afterwards fails from a reverse action setting in. These manures are not stimulants, they are plant foods purely and simply.

It must be admitted that material of a stimulative nature is often applied, acting both as a manure and as a stimulant. Instances of this are in the case of gypsum and lime being added to cold, water-logged, or peaty soils. In these instances material is used by the plants as a food; and at the same time the soil, being naturally cold and deficient in lime, is warmed, sweetened, and stimulated into action by the lime or gypsum.

BEES AND THEIR PRODUCTS.

(Paper read before the Wooroloo Progress League by the SECRETARY.)

Perhaps no living things are more interesting, and certainly none are more industrious than the Honey-bee. They are interesting in more than their ways and habits are concerned. Drawing our inferences from the Bible, we find that bees were known and their products made use of many hundreds of years ago. During the journey of the children of Israel from Egypt to Canaan we read that God constantly encouraged Moses by describing the promised land as "flowing with milk and honey." Again, later, we read of John the Baptist, in the early chapters of the Book of St. Matthew, that his meat was "locusts and wild honey." These quotations prove that bees were known to man in those remote periods, and that the Heaven-sent gift of honey was fully appreciated goes without saying. For other indications of the antiquity of the human knowledge of bees, a short article appeared in the *Leader* some time ago describing the discovery and opening of an early Egyptian tomb, dating more than 2000 years B.C. The article stated that on opening the coffin in which the mummified body lay, several bees in a state of perfect preservation were found, and that they had probably been placed there by human agency. We are told a bee-student of ancient times (66 B.C.), Aristomachus of Soli, in Celisia, devoted nearly the whole of his time and thoughts to bees for 60 years, and that another, Philiscus the Thracian, spent his days regularly in the woods in order to investigate them in their wild state. The Latin Poet, Virgil, wrote of bees in his Georgic IV. Virgil died in the year 19 B.C. and was a farmer poet of the Roman Empire. Gleanings from Ancient History such as these cannot fail to interest everyone, but to the modern and scientific apiarist of 1905 A.D. they give food for thought that would not present itself to an unassociated mind. We bee-keepers naturally ask:—Were bees then, as now, worked as an industry, and if so, how? The answer to these and kindred questions can only be conjectural. We know that the bee-keeping of to-day is of comparatively modern inception. A work on bees, their habits and management, written in 1858 by the Rev. J. G. Wood, an eminent student of natural history, while giving a good Life History of the Honey-bee, and a fairly accurate account of their habits, shows that bee-keeping, as we understand it, was only in its infancy. The extractor was unknown and was invented some 12 years later by Major Francesco de Hruschka, of Venice. Straw and box hives were then in general use, although experiments were being made with hives having movable tops with plain bars of wood across for the combs to hang from. Clipping Queens and artificial swarming were undreamt of. This being the state of affairs half a century ago it is perhaps the natural decision that thousands of years ago things were a great deal worse. But when one pauses and thinks of the advancement of civilization in some of the countries washed by the Mediterranean in those remote ages, the former decision does not seem final. Is it consistent with the manner of human advancement that the men who built the Pyramids and the mighty Sphinx; who throned the Pharos of Egypt of Joseph's time; and the men who founded the City of Rome and conquered the then known world should not have had their scientific bee-keepers as well as the nations of to-day. Their advancement and civilization was equal to ours in many things, and indeed, in some superior, and it is not conceivable that such a comparatively simple art as bee-keeping should have been forgotten. Although the ancient poet Virgil strove to make it clear in his fourth Georgic that bees were the progeny of blow-flies or rather rose in some mysterious manner from the dead body of a young steer, I am inclined to think that bee-keeping may be numbered among the forgotten arts, inasmuch that it had reached a high state of perfection in by-gone ages in certain parts of the world, was decadent, and is now only in its revival. Virgil based his poem upon the observations of one, Aristotle, a Macedonian, who died in the year 322 B.C. and was a man of great note. Aristotle's observations were probably correct originally, but as some 300 years elapsed before Virgil wrote his knowledge of them may only have been traditional, and therefore not reliable. To Aristotle, who was a great Natural Historian, is attributed the first discovery of "Parthenogenesis," that peculiar property that a bee-egg has of producing a male bee independently of the Queen having been fertilised. If Aristotle at that early date had such an insight to the intricacies of bee life as this, then I think my theory is tenable, and that Virgil's poem is merely a sarcastical interpretation of an almost lost tradition, or, was written in the spirit in which it is taken to-day.

To say that bee-keeping has reached that stage when the methods and implements adopted for the working of bees can no longer be improved upon, would indeed be a rash statement. When we compare the position of the industry of 50 years ago and that of to-day the advancement is truly striking. The Rev. J. G. Wood, in his work about the former time, discusses the question, "Can bees be made a source of profit"? The yield of honey in those days was from 20 to 30 lbs. per hive per annum, although this quantity was sometimes exceeded, and the bees were often destroyed during the robbing. Now a hive yields from 60 to 150, and sometimes 200 lbs., and there is no doubt that bee-keeping is entitled to rank among the most profitable of rural industries. The reason for this great change is not difficult to find. It is not that the honey-flows have increased or that the race of bees has improved: they are both exactly the same as years ago. The change is due to the great improvement in the implements used in working the bees. The Rev. Wood mentions what is probably the first forerunner of the "smoker" now in use. It was invented by a Mr. Cotton, and consisted of a tin box, made to fit the nozzle of an ordinary pair of bellows. The burning material was placed in the box, and the smoke was forced through a long slender tube into the hive. It was called a fumigating machine, but I think a more appropriate name would have been "infernal" machine. In working, the nozzle was placed in the hive, all other entrances being blocked up with clay, and the hive was filled with smoke until the unfortunate bees were heard falling on the bottom, stupefied. The "smoker" of to-day is too well known to need description. A comparison of the two is interesting, however, as showing the advantage the modern agriculturist has over the man of 50 years ago in this matter alone. A review of the positions of then and now will reveal an advancement that is fully realised only by few, and it is probably no hyperbole to opine that when another half-century has passed, the hives, implements, and methods of handling bees in vogue to-day will have been long since antiquated.

Bees belong to the genus *Apis* of the order of insects known as *Hymenoptera*, which order also includes ants, wasps, hornets, gall-flies, and some others. Bees form part of that section of insects called *Mandibulate* insects, *i.e.*, insects that eat with jaws, in contradistinction to the *Haustellates*, or insects that lap up food through a trunk. Beetles, hornets, and other insects are also *mandibulates*, but bees have a further distinction in that they lap up food with a "proboscis," and afterwards transfer that food to their mouths. It is a fact, though not well known, that a bee when engaged upon a blossom the nectar of which it cannot reach in the ordinary way bites a hole just over the part where the nectar is found, inserts its proboscis and extracts the hidden sweets. There are many known varieties of bees, and probably many that are not. The most common we have at Wooroloo, viz., the Black English, and the Ligurian, or Italian bee. Other varieties are the Albino, Carniolans, Cyprians, Holy Land, and Egyptian. The Albinos resemble the Italians in colour, but are not so hardy, and are decidedly inferior to them as honey-gatherers. The Carniolans are said to be a variety of the black bee, and are very gentle and easily handled. They are larger than the ordinary blacks, and do not boil over with confusion when the hive is opened as do the blacks. They are reputed excessive swarmers, however, and this alone must condemn them. The Cyprians and Egyptians resemble the

Italians, but are said to be very vindictive, and are better viewed from a distance. Beside these there are numerous other varieties of bees native to all parts of the world. In Root's "A B C of Bee Culture" mention is made of two varieties of black bees native to North America. From tropical Central America we hear of stingless bees. The native bee of tropical Queensland is also stingless, but, alas! has proved practically useless for honey-gathering purposes. Sir J. D. Hooker in his *Himalayan Journals* says that in the Tholonot Valley, in the Himalayan Mountains, to the north of India, he constantly came across large pendulous wild-bees' nests. The nests generally hung from a shelving cliff, and were so large as to be discernable half-a-mile off. It is interesting to note that these bees, which were very large, appeared to scorn other shelter than that afforded by the cliff. Sir J. D. Hooker states that their honey is at certain times of the year very good, and is eagerly sought for by the natives who descend the cliffs to rob them on long bamboo ladders. In China we read there are also pendulous nest-building bees, though much smaller than the above. In our own bush there is a wild bee, which, though small, appears to be very industrious. The bee is black in colour, and is about half the size of the ordinary bee. I have several times caught them, and there is no mistake as to their being a bee. They appear to be stingless, and if one could obtain a colony of them might prove of commercial value.

The marketable products of the bee are honey and wax. In juxtaposition with these, also, is queen-rearing, inasmuch that while not deteriorating the value of the hive it is a means of raising revenue therefrom. Honey is gathered by the bees, in the form of nectar, from the flowers and sometimes the leaves of certain plants. When gathered, however, it is simply the nectarean exude of plants and not the beautiful golden honey we take from the comb. It is converted into honey by the bees by a process of evaporation. Just when and how this evaporation takes place does not seem to have been quite determined. Root, in his "A B C," gives it as his opinion that the nectar is converted into honey while the bee is on the wing. He bases this opinion on the fact that while flying bees constantly emit a thin, watery substance. This, he contends, is the waste matter, and that carried to the hive is honey. Doolittle, another eminent bee authority, however, denies this, and insists that the conversion takes place in the hive. The matter emitted by the flying bee is, he thinks, only excrement and in no way connected with nectar. Root and Doolittle are both scientific and practical bee men. Further, they both seem to have devoted their lives to bee study, and are taken as authorities all the world over. When two such authorities as these differ, then it is indeed a hard matter upon the true method adopted by our "little friends" for the manufacture of honey. I am inclined to think that there may be right on both sides, and that the partial conversion on the wing is brought to finality in the hive. If we take out a comb a day or so after extracting, the liquid in the cells is certainly not the nectar that we can shake out of a white-gum blossom, nor is it the honey we take from a capped comb a week or ten days later. The analysis of honey show that it is more largely water than one would think. Its other constituents are sugars in different forms. As a food, honey should be more largely used than it is, both for the table and for cooking. Its two main sugars, dextrose and levulose, may well take the place of cane sugar in the culinary arts and would, I think, prove more palatable. Mead, the drink of the early Teutons, was prepared from honey, and is still to be found in a great many parts of Europe. The Proverbial "Milk and Honey" is also a pleasant and wholesome drink. That honey is, in rare instances, poisonous is well-known, though fortunately Australia does not add to the list of poisonous nectar-bearing plants. In Northern India, the bees mentioned in the *Himalayan Journals* gather poisonous nectar from the Rohodendron blossoms at certain times of the year. In the November issue of the *Australian Bee Bulletin* there is an account of serious illness resulting from the eating of poisonous honey in New Zealand. The honey was found in a deserted Mouri "whare" by a shooting party and was partaken of by all, with unfortunate result. We are informed that this honey was probably gathered from the "Waikarike" a plant resembling watercress, but with yellow flower. Root, in his "A B C," mentions the American Mountain Laurel and the yellow jassamine among others as poisonous honey-producing plants. These two latter are extremely powerful narcotics, but I have not been able to discover the form of poison in the others mentioned. Honey possesses great preservative properties, and cannot be beaten for preserving all sweet sorts of fruit. The preservative powers of honey are employed in a rather startling manner by the Khasias, a tribe of Indo-Chinese in the Himalayan Mountains. These natives cremate their dead, but owing to the continuous rains during the wet season a fire is not readily obtained and the corpses are preserved—until finer weather—in honey, when they are cremated with all barbaric splendour. I have read that this practice is also prevalent among the natives in parts of the Malayan Peninsular.

Bees-wax is the best known wax of animal origin. It consists of a mixture of three substances: myrician, cerotic acid, and cerotein. As an article of commerce, there is a large demand for it. Pure bees-wax melts at a temperature of 145deg., and is a highly inflammable article. For many years it was thought that bees-wax was gathered from the flowers, but close observation has long since demonstrated that this is not so. The wax exudes from the body of the bee in thin flakes. Often we can see it lying on the bottom-board as if over-produced. The uses of bees-wax are many. The most important from a bee-keeper's point of view is the making of "foundation." Although it is possible to get a limited number of nice strait combs of worker cells built without foundation, it seems to me that the invention and perfecting of foundation has done for the apiarist what the Röngten Rays will, and has, for the surgeon.

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Bees-wax was extensively used amongst the ancients. They employed it largely in all their religious ceremonies, embalming their dead, and as an ingredient in precious ointments and salves. The old Roman used it on his writing tablets, and mixed with resins for caulking the seams of his vessels to render them water tight. To-day it is used almost universally. Who has not heard of the wonderful waxworks in the different cities of the world where life-sized and realistic figures of saints and scoundrels fraternise under the same roof; or a good Catholic promise so many wax candles to the Omnipotent for a good fruit crop. As some of us know it is used by dentists to obtain the impression of the patient's jaw. It would take too long to enumerate the many and various uses for bees-wax, and for me its best use is in that I can get 1s. or more per lb. for as much as I can produce.

STRAWBERRY CULTURE AT KALAMUNDA.

By G. WHITTINGTON.

According to instructions, on 12th December and other dates, I went to the strawberry growing district in and around Kalamunda, and was very much surprised and grieved to find in nearly all gardens the plants had very much deteriorated since my last visit, at which time there were indications of a fairly good season. After a thorough investigation throughout the district, I find that there are five causes for dearth of fruit and failing of plants. Firstly, the early part of the season was cold and wet; once at least there was a heavy hail storm and a frosty night just when the plants were throwing up their trusses, which would account for a large portion of the early fruit becoming black and blossoms dying back. With excessive dampness, the fungus disease (leaf blight) had very favourable conditions to spread itself, which it has done considerably. These two causes alone would materially minimise a crop of strawberries in any locality, but in this particular neighbourhood and season there are three additional causes over and above the two mentioned, and to all appearance each one is doing more damage than did either the frost or fungus. One is a very small brown bug (the larvæ of the chinch bug as identified by Mr. Lea), which attacks the fruit in considerable numbers, and forcing their needle-shaped proboscis in the fruit abstract the juices therefrom, leaving the fruit in such a shrivelled, bad-coloured, messy condition that it is quite unsaleable. So powerful are they to abstract the juice that the berry so treated will, if kept a day, shed its seeds on the least oscillation.

Another, a larger and black bug, about ¼in. long, is perforating the stems of leaves and trusses of fruit with its proboscis and abstracting the sap, and eventually the truss and leaf dry up and die, thus turning a splendid green healthy plant into a leafless, trussless, sunburnt-looking bush. The next is a dark greyish weevil (identified by Mr. A. M. Lea, the Tasmanian entomologist, as *Desiantha Maculata*), about ¼in. long, which enjoys a meal from both stem, leaf and fruit. It is partial to the young leaf just emerging from the crown; it will attack this with its powerful jaws which are situated at the end of its trunk, which is about one-quarter the length of its whole body and in appearance somewhat like the trunk of an elephant; it also spoils the fruit by nibbling small holes all over it, especially the best and ripest. These are the diseases and pests which I found the district suffering from, and below are the experiments I tried:—

Benzine killed plants and pests. Benzine with 6 and 8 parts water killed plants and some pests.
Gas Tar Water destroyed plants and some pests. Gas Tar Water, pint to gallon of water, ruined plants, did not kill pests.
Formaline destroyed plants, did not affect pests.
Seymour's Powder improved plants a little but did not hurt pests.
Sulphur dusted over plants improved them a little and also partly kept pests off.
Nitrate of Soda improved plants and partly kept pests off.
Paris Green bait destroyed quantity of weevils but not bugs.

I should advise growers to be very careful this next winter to burn all the leaves and rubbish on the strawberry plantations so as to destroy as many of the beetles as possible, to spread plenty of Paris Green bait about, and spray the plants early in the season with Bordeaux mixture, and a little later with a solution of Paris Green, lime, and treacle. I am afraid a large quantity of plants will die out this season and I would draw planters' attention to my remarks *re* New Plantations, in the JOURNAL for November, 1904.

EXPERIMENTAL FARM, NARROGIN.

HARVEST RESULTS, 1904.

By FRANK L. FAULKNER.

Harvesting operations were commenced, on October 10th, with silage-making, which proceeded till the 15th. The silage was then weighted, and allowed to settle for a week, after which the weights were shifted, and the pit refilled. The weights were then put on again as quickly as possible.

Altogether about 15 acres of the worst and weediest patches of wheat, rye, and oats were cut for silage, and from 25 to 30 tons of stuff were got into the pit. The material was put in long, as we had no convenient means of chaffing it.

Cutting the crop was proceeded with just about at the flowering stage. It was carted in as quickly as possible after being cut. In the pit the heat was allowed to rise up to, but not over, 140° F. This pit of silage has lately been opened, and although there is a good deal of waste round the sides owing to the pit walls being built very rough and out of plumb, the silage is on the whole good, and the cattle take to it readily.

Hay-cutting was commenced early in November, and proceeded well, with little bad weather; hence a nice, sweet, clean lot of hay was obtained. The results of the hay crop could be only approximately estimated, as we have no bridge or means of weighing the crop.

The estimated results were as follows:—

Variety.	Date sown.	Manure at rate of 90lbs. per acre.	Description of soil and preparation given.	Yield per acre in tons.	Remarks.
WHEATS.					
Baroota Wonder	May 4	Part Superphosphate, part Bonedust	Good red loam; new land. Summer-ploughed and scarified	1¼ to 1½	A good clean-strawed, bulky hay wheat
Medick	,, 3	Part Guano, part Super Bone	,, ,, ,,	1¼	On low land. Suffered from excessive wet. A good hay wheat
White Lammas	,, 6	Part Super Bone, part Bonedust	Hard, red land. Ploughed and cropped with very rough tilth	1	A good hay wheat; tall grown.
White Lammas	,, 21	Part Guano, part Superphosphate	Poor gravelly land—stubble. Ploughed and sown again	½ to ¾	
Jade	,, 23	Part Superphosphate, part Super Bone, part Bonedust	,, ,, ,,	½ to ¾	Light crop of good quality hay
Australian Talavera	,, 20	Super Bone ...	,, ,, ,,	¾	Light crop of nice quality hay. A good hay wheat
Sullivan's Early	,, 17	Super Bone ...	Rather poor, new land, but summer ploughed	1¼	A fairly heavy crop, but not a good hay wheat, being coarse and hard in the straw and chaff
Sullivan's Early	,, 18	Guano	Low-lying stubble land	¼ to ½	Suffered more than other wheats from excessive wet
OATS.					
Chinese Hulless	,, 13	Guano	Good red stubble land; rather roughly prepared	¼ to ½	Not much good for any practical purpose
Algerian ...	June 9	Super Bone ...	New land. Fairly nice loam. Ploughed and sown direct	1 ton	A fair crop of nice quality hay. A good mid-season oat
American Early Ripe	,, 7	Super Bone ...	Part new land, and part stubble. Ploughed and sown direct. Part low-lying near creek	¾ ton	Crop suffered from wet. A good early oat; good quality hay

The Grain Crop was all cut with the binder, and threshed with one of Messrs. A. W. Gray & Sons' horse treadmill threshers. Threshing was commenced on 19th December, 1904, and completed on the 16th January, 1905. About 1,200 bushels were taken off of 93 acres, the results being as follows:—

Variety.	Date sown.	Manure at rate of 90lbs. per acre.	Description of soil and preparation given.	Yield in bushels per acre.
WHEAT.				
Alpha ...	April 25	Bonedust ...	Good red jam country. Summer ploughed. Suffered from excessive wet	7·5
,, ...	,, 25	Superphosphate		
Jade ...	,, 28	,, ,, ...	Part same as alpha, part coarse rubble land. New	10·5
Australian Talavera	,, 29	Part Bonedust, part Guano	March ploughed brashy rubble. Poor country	11·0
Medick ...	May 3	Part Guano, part Super. Bone	Summer ploughed. Good loam. Rather wet	13·8
Baroota Wonder	,, 4	Superphosphate ...	,, ,, ,,	11·4
Sullivan's Early	,, 11	Part Bonedust, part Superphosphate	Part good loam (wet), part brashy rubble. Ploughed new land	13·8
Fillbag ...	,, 16	Superphosphate ...	Part good loam (wet), part rubble. Poor land	16·6
Federation	,, 16	,, ,, ...	,, ,, ,,	16·3
Marshall's No. 3	,, 19	,, ,, ...	,, ,, ,,	19·5
Sullivan's Early	,, 19	,, ,, ...	,, ,, ,,	15·0
BARLEY.				
Malting, Chevalier	,, 31	,, ,, ...	Part loam, low-lying; part deeply ploughed white sand. New land. Ploughed and sown	15·0
Cape ...	June 21	Super. Bone	White sand. New land. Ploughed deep	14·0
OATS.				
Chinese Hulless	May 13	Guano	Stubble land. Ploughed and sown	Very poor; cut for hay
Algerian	June 9	Super. Bone	Loamy to white sand. New. Ploughed and sown	14·2
American Early Ripe	,, 7	,, ,, ...	Loamy to wet, hard land near creek	14·6

RYE.—Sown 12th May on stubble land; ploughed up and manured with 90lbs. bonedust; gave about 1 ton to the acre of green stuff for the silo in October. The second crop was promising, but only gave 2½ bushels of grain to the acre, many of the heads being dummied.

NOTE.

It must be observed that these experiments have been conducted not only as experiments, but as the main crop. The date of sowing, kind of soil, and the kind of manure and cultivation applied varying greatly; consequently the tests are not conclusive, and it is difficult to draw even approximate comparisons.

EXPLANATORY NOTES—WHEAT.

Alpha (a new wheat created by the department at the Hamel Experimental Station), with a yield of only 7½ bushels per acre, is no doubt one of the best early wheats in the State. The reason for its failure here is that it was sown on low-lying land, and sown too early for such a quickly-maturing variety, resulting in a very bad pollenisation of the flowers and a weak lodging straw.

Jade, a mid-season to early wheat, with a large, long grain.

Australian Talavera and *Baroota Wonder* are too good early wheats, with a good longish head, nice clean stiff straw, and nice grain. Both good hay wheats, and do well on poor land.

Medick.—A good mid-season stooling wheat, with a long, large, good grain, but heads do not fill well. Variety suffered from effects of wet patches very much.

Sullivan's Early.—Identical with Stienwiedle. A good yielder, early and hardy, giving a good sample of grain. Very bad to shell, and not good for hay, straw and chaff being hard and brittle, and at the same time light. Suffered much from wet.

Fillbag.—A mid-season semi-club head wheat, with large, heavy head; rather tall, stiff straw. A good yielder, and good on wet country.

Federation.—A rather short-growing, stiff-strawed, brown-chaffed wheat, with a good head and nice grain. Resembles Allora Spring somewhat. A good wheat, and does well on wet country comparative to the earlier varieties.

Marshall's No. 3.—A rather short-strawed, long-headed, mid-season wheat. Holds the grain well, fills well, and good on wet country. Recognised as one of the best rust-resisting wheats grown. A heavy yielder. A good wheat to sow early; but do not sow too late.

OATS.

Chinese Hulless (Avena Nuda) proved not worthy of further trial, being poor doers and light yielders.

Algerian.—A good hardy, plump, light-brown oat, with a nice, soft, palatable straw.

Early Ripe.—Good yielders and good sample. Early and hardy. Straw taller and not such good quality as the Algerian.

BARLEY.

Chevalier Malting.—One of the best of malting barley. Hardy, prolific, and with proper treatment should do well on much of the lighter soils of Western Australia.

Cape.—Grew well, considering the manner in which the land was prepared for it. The best barley to grow for feeding purposes.

MANURE TEST PLOTS.

Half-acre plots drilled in on 1st June with one bushel "Sullivan's Early" wheat, and manure to the value of 10s. per acre. Soil, freshly grubbed and cleared white sand.

Plot No. 1.—Superphosphate yielded 293lbs. = 9·7 bushels per acre.
„ 2.—Guano (phosphatic) yielded 275lbs. = 9·1 bushels per acre.
„ 3.—Thomas' phosphate yielded 280lbs. = 9·3 bushels per acre.

The result of this plot was much spoilt by boody rats, plot No. 1, if anything, suffering the most.

In conclusion, it will be noticed that, generally speaking, those plots that received either superphosphate or super bone have given the best results.

Those on the higher, lighter land have done the best, owing to the excessively wet conditions on the lower country. However, all else being equal, the later wheats, especially "Marshall's No. 3" and "Farrer's Federation," stood the drowning much better than any of the other varieties.

NOTES ON THE EXPERIMENTAL FARM, NARROGIN.

By FRANK L. FAULKNER.

The past month has again been an exceptionally changeable one for this time of the year; 1·11 inches of rain were recorded. Three thunderstorms were experienced during less than a fortnight, one of which was accompanied with a heavy hailstorm. This storm damaged several crops throughout the district, but the farm crops were practically all in the stook by that time and so escaped.

Up to the time of writing the farm crops have, many of them, turned out better than anticipated, yielding in one case 19½ bushels per acre, and averaging 12 to 14 bushels all round.

In the manure test of phosphatic manures superphosphate has given a higher yield than any of the other less soluble manures.

Of the varieties of wheat the later maturing varieties have, if anything, given a better yield than the early maturing ones, and have also stood the excessive wet on the low-lying country better than the early maturing varieties.

As soon as the harvest is completed a report of the crops and manure tests will be prepared and forwarded for publication.

A good stack of barley and oaten straw, in fact all that we had, has been stacked, and will be reserved for dry and young stock during the summer and early winter.

About ten acres of land that was cut for silage in October has given us another cut of over 5cwt. of nice manger hay, and a crop of rye cut at the same time now promises a fair crop of grain.

The ensilage pit has just been opened, and, even although the material on the top and sides is inferior, the cows are taking to it readily.

Potatoes have done very well on the farm this season, and a crop estimated at 3 tons per acre has just been dug. A report on these will be prepared when the crop is brought in and weighed.

Summer crops are only represented on a very small scale this season owing to the lack of sufficient cleared country for the purpose. A small patch of maize sown about the middle of October is doing well, being six or seven feet high in places.

A few plants of pearl millet have done very well, as also have a few self-sown sunflowers that found their way into the maize and potato patches.

A small patch of paspalum, planted two seasons back, is doing well, with good growth three to four feet long, and young plants are germinating amongst the older sown, making the whole a mass of green.

What summer crops we have here this season are doing so well that I am sure that, with proper treatment and cultivation, many summer crops can be grown successfully for green feed all through the district.

Of the vegetables, carrots and parsnips are giving us plenty. Summer rhubarb has been supplying us with plenty of good stalk for months past and is still doing well without irrigation. Farmers should not be without a few plants of this hardy and delicious fruit.

Tomatoes, melons, and cucumbers, although they got a very late start owing to the very wet October, are now doing well and setting freely.

Pumpkins are growing well but not setting freely, being sown on a spot rather too dry for them. These vegetables, although not grown on a pump as the name would lead one to think, require to be sown close enough to come constantly under its lixiviating influence if satisfactory results are to be obtained.

The flock of angora goats brought on to the farm some time back were shorn last October and dipped, since when they have thrived wonderfully well. Four kids dropped about three months back have done splendidly, although one of them succumbed to poison a few weeks ago. The angora is, I think, fully as liable to the effects of poison as the sheep, and, being naturally a browser, they attack the poison shrubs almost more readily than sheep. With us at present, however, they are all kept busily occupied in the stinkbush thickets, touching little else and requiring practically no water at all.

Last winter these goats did not thrive here very well owing to the excessive wet weather, and also partly on account of their not being acclimatised. It will be interesting to watch their progress during the coming winter, when they will have become more used to the conditions and climate.

Feed is plentiful at the farm at present, although dry. The supply of water, although not very excessive, is sufficient as yet for all stock on the place. Stock are, almost without exception, in good condition.

[NOTE:—This was received too late for use in the January issue of the JOURNAL, and refers to work done between the middle of December and January.—ED.]

POTATO-GROWING AT THE EXPERIMENTAL FARM, NARROGIN.

By FRANK L. FAULKNER.

The potato crop at the farm has this season been fairly successful. It was sown on land originally fairly heavy red gum country, varying from a fair sandy loam to an almost fine white sand.

Planting was done on the 23rd and 24th of August. Some of the varieties had the advantage of a fair dressing of stable manure, which showed a decidedly beneficial influence; and all of them were treated with about 4cwt. of phosphatic manure per acre.

There was a great difference in the quality of the seed sown, and the results vary accordingly.

Beauty of Hebron.—About $\frac{1}{8}$ acre sown, treated with stable manure, bone-dust, and good seed, gave 10cwt. 17lbs., or equal to 4 tons 1cwt. per acre, of very nice, shapely, firm potatoes.

Sutton's Flourball.—Rather over $\frac{1}{8}$ acre sown, treated with stable manure, bone-dust, and the seed good, gave 10cwt. 3qrs., or equal to 4 tons 6cwt. per acre, of nice spherical-shaped, bright-skinned potatoes. These tubers were of better quality than the Beauty of Hebron although not so numerous. The crop, however, was rather heavier.

Early Rose.—About a quarter acre sown gave only a little over 3cwt. of small tubers, or equal 12cwt. per acre. This variety suffered the disadvantage of having no farm-yard manure, and the seed sown was small and poor.

White Elephant.—About one-twentieth acre sown similarly to Early Rose, but with better seed, gave only poor returns, equal to about 15cwt. or 1 ton per acre.

A number of small plots of imported potatoes were set with about 4cwt. of bone-dust per acre. The potatoes were all very poor seed sown, and although many of them failed a few very promising varieties have been selected.

Crofter.—A very prolific shapely potato, similar to the Beauty of Hebron, but more uniform in shape. A useful variety.

Idaho.—Fairly prolific, round white potato.

Circassienne.—Kidney-shaped, long and wasty, fairly prolific, but small.

British Queen.—Similar potato to Crofter in shape, but poor.

Crapandine.—No good.

Waverley.—Brown, flatish, similar to Crofter in shape. Prolific, good, very deep rooted.

American Chili.—Small, round, purple, poor.

Dobbie's Favourite.—Fair white oblong potato, not very prolific. Other varieties that failed were—"Araucana Blanca Chili," "Mangu Blanca Chili," "The Norwich," "Sirdar," "Purple Russet," "Abundance," "Cangui," "Doye's Chili," and "Princess May."

Of all the above-named varieties "Sutton's Flourball" appeared to suit the conditions best, giving a very fair crop of fine sampled potatoes.

In the manuring, stable manure showed very marked results, giving a little body to the loose white sand.

No potassic or nitrogenous manures were tried, but I am inclined to think that their addition would have materially increased the crop, particularly in the absence of the stable manure.

PERMANENT PASTURE COMPETITION.

RESULTS AND JUDGE'S REPORT.

It is a recognised fact that but few of our native grasses remain succulent from the middle of summer onwards until some time after the rainy season has caused fresh growth to cover the land, and it is to artificial fodder plants that the producer has to look to maintain his flocks and herds in a thriving condition. Realising this, the Wellington Agricultural Society, with commendable enterprise, some time ago promoted a "permanent pasture competition," the object of which was to encourage stockowners to provide succulent and nutritious feed for that period of the year when cattle are particularly in need of it. A sum of £100 was offered in prizes, and the plots entered for competition were grouped according to area under four classes, ranging from 1 to 10 acres and over, and three prizes of from £15 to £3 each were provided for each of these classes. In addition special prizes were provided for allocation by the judge for experimental trial plots of special interest. Owing to the inability of Mr. A. Crawford to officiate, the task of inspecting and adjudicating upon the entries devolved upon Mr. A. Despeissis, of the Agricultural Department, and the results, with his report upon the competition, are as follow:—

CLASS "A" (1 to 3 acres).—Mr. O. Rath, Harvey, 1; Mr. P. Buckenara, Ferguson, 2; Mr. A. Clifton, Brunswick, 3.

CLASS "B" (3 to 5 acres).—Mr. Edwin Rose, Wedderburn Park, Brunswick, 2.

CLASS "C" (5 to 10 acres).—Mrs. M. W. Clifton, Wokalup, 1; Mr. O. Rath, Harvey, 2.

CLASS "D" (10 acres and over).—Mr. Mervyn Thomson, Brookhampton, 1; Mr. John Duce, Boyanup, 2; Special prize, Mr. Gerald L. Parker, Waterloo.

CLASS "A" (1 to 3 acres).

The number of entries in this class was the most numerous. Nine competitors entered in the spring, but four withdrew since, the "starters" being Messrs. O. Rath, Harvey; P. Buckenara, Ferguson; A. E. Clifton, Innadong, Brunswick; Edwin Rose, Wedderburn Park, Brunswick; and C. E. Edwards, Waterloo.

Mr. O. Rath, Harvey (first prize).—The field is situated on the river flat, along the Harvey River, a little over two miles from the station. It was once under blue or flooded gum and blackboys. That class of land costs about £8, after ringbarking, to clear completely, but the work has not been thoroughly done. The soil is a somewhat heavy alluvial, overlying a yellow clay subsoil, which is fairly retentive, and is heavy to plough in the winter months. That fact prompted the owner to lay it down to pasture. The rainfall in the locality amounts to about 40 inches, the rainy season extending from April to October. A portion of the paddock was four or five years ago sown in the spring—August or September—with *Paspalum dilatatum*, and the same land was in the autumn—April or May—sown with perennial rye grass. The idea was to provide late summer feed, as well as an early growth of rye grass, directly after the rainy season sets in. The rest of the paddock, after two consecutive seasons under field peas, was sown in the spring with perennial rye grass and cocksfoot. The rye grass, stands heavy feeding in the winter, while the cocksfoot does best later, and also prefers better drained land. Some lucerne seeds were also added to the mixture, the plants coming up well the first year, but being smothered by both grass and weeds during the ensuing winter. A little Kentucky blue grass was also incorporated to the mixture, together with both Allsike and white clover. Of these the white clover does the best, and stands hard feeding. The field has received fairly liberal treatments of manures and fertilisers. Thomas's phosphates, bonedust, superphosphate of lime, and sulphate of potash were used, either singly or in combination with one another. About 3cwt. per acre at intervals have already been applied, while the bare patches have had a supplementary dressing of stockyard manure. Although this two and a-half acre paddock is heavily stocked, paspalum has not hitherto received much attention from the cattle, which show marked partiality to the European grasses while they last. Only a few horses have been turned into it, as they feed rather close, and expose the rye-grass roots to the parched-up surface soil.

Mr. P. Buckenara, Ferguson (second prize).—Unlike the previous competitor, Mr. Buckenara has directed his attention to the growing of one kind of grass only, and has selected *Paspalum dilatatum*. Since its introduction from its native home, in South America, this grass has established for itself a reputation which has been sustained wherever it has been tried. Although not so much relished by stock as rye grass, cocksfoot, lucerne, or the clovers, its easy adaptation to all kinds of soils and climates, and its remarkable drought-resisting power, is making it a favourite for climates like ours, where the summer is long and dry. In 1902 Mr. Buckenara planted a patch on a moist piece of land, thickly covered with couch. The standing trees around are red and blue gums; the land was once under corn, and has been fertilised with guano. The ground is naturally moist, and water is struck at a depth of about 7 feet. Since planting, the paspalum has spread over the enclosed ground, which consists of about half an acre, and in places it has smothered the couch out. Half an acre of such pasture would keep a cow during the summer months. From this piece, roots and seeds were obtained for sowing and planting another one on the hill slope. The ground selected is a deep chocolate loam, once under red gums and blackboys. It has not been thoroughly cleared, the scrub only having been knocked down and burnt, as well also as those tree roots which would have made ploughing difficult. The cost of the clearing done amounted to about £4 per acre, after ringbarking. The paspalum seeds were broadcasted by hand, in the spring—September, 1903—on fallowed land, which had previously carried a crop of oats, and received a dressing of guano. About 2lbs. of seeds, costing 2s. 6d. per pound, were used to the acre. Conjointly with this sowing, about three-quarters of an acre was planted with rooted slips, dibbled in rows 2 feet apart, the plants being spaced 1 foot only in the rows. Considering the cost of this operation, and the spreading habit of growth of the grass, wider distances apart would have been attended by sufficiently good results, and would have reduced the cost of planting. These rooted slips have now practically covered the ground. The grass is growing quite as luxuriantly on the uncultivated headland and on unbroken land under the fence as it does on the cultivated land, which was subsequently ploughed. The sown portion of the paddock, which came up rather thinly, was, after a few months, broken up, the paspalum being readily destroyed by cultivation. Unlike couch grass, there is no occasion to fear that *Paspalum dilatatum* will prove a pest in cultivation paddocks. After the winter (1904) the grass commenced to grow again as luxuriantly as ever in the spring, and it was cut with the binder in December. It has not been stocked and fed down since, and at the time of my visit the paspalum again showed good growth and was seeding profusely.

Mr. A. Clifton, Innadong, Brunswick (third prize). The plot is on a bend of the river, on blue or flooded gum and bracken fern land. The ground is not even, and shows a succession of waterlogged cups, which in the summer are put under potatoes. The undergrowth has been cleared, and the trees ringbarked the cost amounting to £7 per acre. More thorough clearing would have cost about £10 per acre. The ground was roughly ploughed once in July, 1903, and a crop of oats taken off in November, no manure being applied with the oats. Red clover seeds were sown at the rate of 7lbs. per acre—a very thin sowing. The paddock was first stocked with dairy cattle towards the end of last summer, and thence on till the beginning of last December. It is now looking well in patches, and bare and weedy in others. The owner says this year's growth is an improvement on last year's. In another plot different strips were sown with cocksfoot, rye grass, and red clover. A quantity of Yorkshire fog—an indication of the careless manner some seedsmen gather their seeds—grows among these plots.

CLASS "B" (3 to 5 acres.)

Two entries only were registered in this class, and at the last hour one of the competitors withdrew, leaving only Mr. Edwin Rose, Wedderburn Park, Brunswick. The plot entered (lucerne) received, during last spring, a severe set-back on account of the continuous rainy weather that was experienced, and the field did not come up to expectation. Mr. Rose expects to derive better results from more drainage.

CLASS "C" (5 to 10 acres.)

Only two entries were received.

Mrs. M. W. Clifton, Wokalup (first prize).—A very promising lucerne field of about six acres, on the bank of the Wokalup River, at the Harvey. The land, which was once under red gum and bracken ferns, consists of a free brown loam, 4ft. to 6ft. deep, in good heart. It was cleared six years ago at a cost of about £12 an acre. Several crops of potatoes and oats have been taken off it. In the winter, 1904, it was ploughed 6in. to 7in. deep preparatory to sowing lucerne. In the early spring it was again stirred up with the scarifier to root out the weeds. About 2cwt. of superphosphate of lime to the acre was applied broadcast, and in the middle of September lucerne seeds were sown at the rate of 10lb. to the acre, the seeds being lightly covered by a Massey-Harris scarifier. They germinated within three or four days, and the crop soon established itself strongly, being cut a first time just before Christmas, when it was about 18in. long and just blossoming. A binder was used for cutting the crop, the stubble being left rather long. Two tons of dry hay were secured, and another cutting will be taken in about a month's time. Although the binder is not the best mowing machine for cutting lucerne which it is intended to cure into hay—the bundles drying too quickly, and as a consequence the leaves breaking off the stems—still, in this particular instance it happened to have been a blessing in disguise. The seeds used, although showing good germinating quality, were contaminated with seeds of dodder, a parasite pest which proves an arch-fiend in a lucerne or clover field. Its presence shows gross carelessness on the part of the farmers who grew the seeds and the seedsmen who supplied them. A ready way of getting rid of it is to distribute over the infected spot about a 10 per cent. solution of green copperas (sulphate of iron), or 1lb. of the crystals to a gallon of water. The action is immediate on the dodder, which is speedily destroyed, while the lucerne or other crop are comparatively uninjured by it. Two applications on succeeding days are quite sufficient.

Mr. O. Rath, Harvey (second prize).—Alongside the smaller field already described under class "A," Mr. O. Rath is laying down a larger one much on the same lines, and has already sown on drained and fertilised ground a mixture of Poverty Bay perennial rye grass, prairie grass, Dutch clover, Allsike clover, lucerne, rib grass, and rape.

CLASS "D" (10 acres and over.)

Three entries were received under this class.

Mr Mervyn Thomson, Brookhampton (first prize), has 11 to 12 acres under lucerne, and established over blackbutt and bracken fern country. The field consists of a gravelly loam of good depth, more or less undulating. Superficial drainage has been provided. The field is one of the cleanest I visited, and gives evidence of systematic cultivation crowned by corresponding amount of success. The lucerne was sown in the autumn, 1903 (middle of May), through a Massey-Harris drill; one cwt. of bonedust and a quart of lucerne seed were applied per acre. One cwt. slaked lime per acre had previously been scattered over the field and, since sowing, some soil imported from a prosperous lucerne field in the Eastern States has also been broadcasted over the area. The ground was then nice and loose, and the lucerne soon came up beautifully, but the first frost turned it red. After the frost, and in the spring, weeds and bracken came up very thickly and looked as if they were going to choke the lucerne. An attempt at dislodging the weeds in the spring threatened to pull out the young lucerne plants as well, so the field was not touched that summer and harrowing was started again at the beginning of May, 1904. This was done at frequent intervals for two months, and after a spell of three months a first cut was made in October, when (says Mr. Thomson) 12 tons of hay were cured. The field was then harrowed four times, and on the 15th December last a second cut of another 12 tons of hay was secured. After a fortnight's spell, on the 1st January last, it had made a growth of six to eight inches, when 10 large store working bullocks were put on it. These hardly made an impression on the growth of the lucerne.

Mr. J. Duce, Boyanup (second prize).—In 1902 Mr. Duce set to work to provide a permanent pasture for his dairy cows, and for that purpose selected a piece of land which had the advantage of being already cleared and of being close to the homestead, but otherwise, and until drained, is not an ideal piece of ground for growing lucerne. The land, which is at the head of the Boyanup Plains, was once under jarrah and red gums, with underground blackboys among them. It consists of a heavy brown loam overlying an ochre-coloured and stiffer subsoil. The cost of clearing is about £8 per acre. A crop of oats was first taken off, after which the ground was ploughed 10 inches deep, 2cwt. of superphosphate were applied, and lucerne seed at the rate of 12lb. to the acre were broadcasted and harrowed in. No drains or water furrows were at first opened, so as to give the experiment a thorough test. The lucerne first came up in a very promising manner, but died off in patches wherever the water lay. It was cut, when about 18 inches to 24 inches high, in the summer, and was subsequently stocked with dairy cattle and horses, carrying one head of stock to the acre in the summer between October, 1903, and February, 1904; then only half a stock right up till the winter, when, as customary, the stock were withdrawn. When the spring came the ground could not be stirred up with the scarifier, as on account of the nature of the field some spots were still too soft to carry horses and implements, while others had become too hard for the scarifier to stir up. The field from September till December last was fed down, carrying one head of stock to the acre; and since December it has carried half the stock. By means of more thorough draining, scarifying, or even reploughing and resowing in places, the field could, I have no doubt, be turned into a profitable lucerne pasture. Even under the disadvantages which have attended the laying down of the pasture, it has carried an amount of stock which has proved it to be a profitable investment.

Mr. Gerald L. Parker, Waterloo.—Mr. Parker was one of the competitors who entered in class "A," his entry being a small field of Kentucky blue grass, Bokhara clover, and white Dutch clover. Unfortunately, the wet spring in this case, too, proved so injurious to the establishing of the plot that he had to withdraw from the competition. A visit to Mr. Parker's farm proved, however, very interesting in showing other grasses quite new to Western Australia growing with promising result, and on that account I would recommend that your society award a special prize of £10 10s. to Mr. Gerald Parker for his enterprise. One plot visited is under *Paspalum dilatatum.* Barley was sown in the autumn, and whilst it was coming up paspalum roots were dibbled in rows 4ft. by 2ft. This appears a good way of establishing that grass, as the barley crop materially checks the growth of weeds, and the paspalum comes up readily after the corn crop has been taken off. The grass has taken a good hold of the sandy loam ground by this time, and the plot will prove a most useful grazing paddock. On another plot is sown a mixture of chicory, yarrow, sheep's burnet, wallaby grass, rib grass, and red as well as white clover. This mixture is one well calculated to establish itself strongly on land subject to long, dry summers. Of these, the chicory promises to be the best, as it grows luxuriantly, and is a very good fodder plant, with a resistant fleshy tap root. Sheep, pigs, and other stock eat it readily, and it maintains its perennial habit, provided it is fed down before flowering. Yarrow and sheep's burnet came up fairly well, and are worthy of attention in various localities, especially the more gravelly and sandy ones. Another plot, again, and one of the most promising, is a bed of *Chloris virgata*, which has all the appearance of proving an excellent summer and autumn grass. Several grasses allied to this one occur in the arid interior of this country, one of which is known as "windmill grass," on account of the appearance of its spikelets. It appears to be one of the most drought-resisting grasses we possess. The seeds were sown on 1st September, and shooted readily. The lower portion of the stem grows couch-like fashion, and roots at every joint. This particular grass was sent to Australia a few years ago from South Africa by Cecil Rhodes, who recommended it to one of his friends in New South Wales. Mr. Parker went to some trouble in procuring a small quantity of seeds, and is, naturally, much interested in the way the new introduction is likely to turn out. Other plots show guinea grass growing alongside another promising newly-introduced grass, namely, the Natal red-top, which is under observation, and looks well.

A few plants of "Japan clover" (*Lespedeza striata*) testified to the hardiness of the plant, it is holding its own although constantly pulled about by ducks. That plant is said to thrive on all sorts of soils from hot dry sandy clay to a light calcareous soil. It is carried long distances by seeds passed through animals, all kinds of cattle liking it well. Heavy frosts are said to be injurious to it, and although doing best on moist ground among grasses, it also stands well the hot, dry soil of the arid districts.

CONCLUSIONS.

As a result of my visits of inspection to the plots entered for competitions (says Mr. Despeissis), several points have impressed me more prominently in connection with the laying down of permanent pastures in Western Australia, amongst others:—

(1.) Wherever the establishing of permanent artificial grass fields is likely to involve some large expenditure of money, a more rigid selection of suitable ground would ensure a greater measure of profit.

(2.) Grasses and fodder crops do best after some suitable preparatory crops, such as afford an opportunity for fertilising the soil evenly and for destroying weeds and useless vegetation. Swede turnips, mangel wurzels, field peas, or some harrowed vegetable crops should prove desirable.

(3.) Sufficient labour is not, in most cases, spent on the ground, which in one instance was merely roughly ploughed, and in most cases had not been reduced to that state of fine tilth which favours an even degree of germination of the seeds, many of these falling between clods and being buried to a great depth.

(4.) A sufficient amount of attention has not been given to the question of drainage, which, by aerating and warming cold wet patches, would lengthen the growing season and insure more bulky crops of fodder. Deep tile drainage has hitherto not received the attention it deserves; and open surface drains, which are of little use only, and interfere with the proper working of the field, and are productive of waste of ground, have been the only type of drainage which have yet been provided to carry away the visible surface water.

(5.) Small fields are more desirable than large ones, for the reason that the work of laying them down to permanent pastures could then be more thoroughly done, and their subsequent management as regards class and number of stock grazed, proper time for cutting, necessity for spelling, top-dressing, scarifying, and weeding could be done with more method, and would result in greater gain.

(6.) The use of phosphatic fertilisers appears, to yield good all-round results, whether grasses proper or crops of leguminous kinds are sown. Fertilisers of richer nitrogenous matter, however, favour grasses; whilst ashes and potash fertilisers, as well as lime, stimulate leguminous crops more actively. Fresh stock manure has been the means of broadcasting sorrel, cockspur, and couch, as well as other weeds, and for that reason that class of manure should be thoroughly rotted before it is used as a top-dressing. Although fertilisers do, in the first instance, stimulate alike the useful grasses as well as the troublesome weeds, they help the grasses to establish themselves more permanently, and weeds are ultimately gradually choked out.

(7.) The following fodder plants and grasses, according to locality or circumstances, will prove, even on unirrigated land, useful as affording summer feed :—

Lucerne.—It is known that climate has in some cases somewhat modified lucerne. For instance, the Peruvian variety (alfalfa) is said to resist drought and frost better than the European varieties. It would be advisable to test it in Western Australia alongside the variety generally sown. A yellow variety (*M. media*) does well on sandy tracts, whilst a variety called "Turkestan" might also be tried, as it is said to grow where ordinary lucerne would not thrive, and it stands drought well. Lime, phosphates, and potash favour its growth, whilst much iron in the soil and stagant water are prejudicial. It is unsuitable for thin soils overlying impermeable subsoil, but will do well on thin loamy soil resting over gravelly or sandy subsoil, where the tap-root can penetrate and imbibe moisture and nutriment.

For lucerne a suitable subsoil is of the greatest importance. For clover a suitable surface soil is more important. It improves rather than exhausts land, and is a summer and autumn fodder rather than a winter one. It can be grown either by itself, and without a protective crop, or in combination with some other fodder plants. The best of these has been found by experience to be the "prairie grass" *(Bromus unioloides)* of Argentine. This mixture gives both quantity and quality of fodder. They are both deep-rooted and drought resistant, but the lucerne more so. The lucerne is best sown in Western Australia in the spring (August-September), after the winter weeds have been cleaned off the field. If wide drills are provided the intervals can be scarified in the next autumn (April-May), when the prairie grass can be sown, thus giving the lucerne six or seven months' start. Both together will choke off weeds, and both flourish alongside one another, the prairie grass feeding in the comparatively upper layer and the lucerne in the deeper subsoil. 10lbs. of lucerne seeds and 30lbs. of prairie grass seeds will be required to the acre.

Scarifying will not hurt lucerne after it has been established a few months, but rather help it to struggle against the more shallow-rooted annuals.

White or Dutch Clover.—A very good pasture grass, which does well on a wide range of soil on account of its peculiar method of rooting. Its deep tap-roots keep it green in dry weather, whilst the more shallow fibrous roots, which strike out of the nodes of the trailing branches, become more active and stimulate the growth during the wet months.

Perennial Red Clover or Cow Grass has proved itself a valuable fodder plant, and does better than the other clovers on alluvial and clay soils. Stands dry weather well, and is recommended in combination with other grasses rather than by itself.

Japanese Clover (*Lespedeza striata*) does not stand frost well, but in the competition initiated by the Wellington A. and P. Society has proved itself to be a good summer grower. Would be useful on fowl and duck runs, having kept green in spite of much pulling about. Worthy of further trial.

Tree Lucerne (*Medicago arborea*).—A native of the south of Europe, and Greece. Must not be confused with "Tagasaste" (*Cytisus proliferus*), which comes from the Canary Islands. It is a shrubby, yellow-blossomed lucerne, of great value to dairymen and stockowners, as, unlike Tagasaste, which has often been reported as being disliked by cattle and horses, all kind of stock browse on it eagerly. The wood is hard and black. It grows to a height of 2 to 8 feet.

Cocksfoot.—A rapid grower, with deep-striking fibrous roots, which readily penetrate porous subsoils, and for that reason not exhaustive on the surface soil. Withstands long spells of dry weather. A rapid grower, which stands heavy feeding, and gives rise to coarse tufts if not kept down by mowing or by stock. It is bad practice to let the young plants go to seed, as, like most permanent grasses, this has an exhausting influence on the plant. It does best in mixtures with red clover or other seeds.

Perennial Rye Grass does best on rich soil, and does not stand drought. This grass is strikingly modified by surrounding influences of soil, climate, etc. The Poverty Bay strain being said to be a good hardy kind. The plant is shallow rooted, and is not long-lived. Grazing—preventing seeding—prolongs its life. Soon after the first rain it supplies an abundance of feed which is much liked by stock.

Prairie Grass (*Bromus unioloides*).—One of the most useful grasses, possessing deep-root system, and consequently resisting droughts. It tillers well, gives plenty of flag, and is readily eaten by stock. It may be cut several times a year, and gives plenty of feed when other grasses are checked by drought or frost. Autumn seeding, at the rate of about one bushel, is recommended. It gives its most luxuriant growth from March to July, and hence is valuable as affording early winter fodder. Mixed with lucerne, gives good results. Another grass, the Hungarian forage grass (*Bromus inermis*), is also worth sowing.

Yarrow or *Milfoil* is very much relished by sheep. It succeeds on poor and dry pastures. Spreads quickly by means of its numerous creeping underground stems. Easily recognised by its finely cut and chiselled leaves.

Burnet.—A perennial herb with a stiff tap-root and branching stem. Bears droughty seasons well, and does remarkably well on peaty land.

Goat's Rue (Galega officinalis) is another perennial forage plant worthy of trial in this State. It is a native of Southern Europe, which does not stand frost too well, but on the other hand is drought resisting, having its roots deeply seated in the ground. Only thrives on deep soil provided the subsoil be well drained, and I have seen it doing very well on the plain of the Mitija, in Algeria, where the soil is deep and free and the summer dry. Like most deep-rooted plants, it is not exhausting, and requires little or no manuring. It stands cutting well, the buds at the base of the stems quickly opening and growing into leaves. About 20lbs. of seed will sow an acre; spring is the best time.

FRUIT-GROWING IN THE SOUTH-WEST.

By J. JEFFERSON.

The peach crop, from Donnybrook to Perth, has been a good one this season. Seldom have I seen the Elberta, Foster, and Crawford carrying better crops. The banks of the Murray River are eminently suited for the growth of this fruit. Mrs. Chris. Alderson, of Pinjarrah, has just gathered nine cases of Elbertas from each of her eight-year-old trees. The fruit was of excellent size and appearance, and averaged 14s. per case in Perth. Messrs. McLarty and Paterson recently informed me that years ago they gathered half-a-ton of fine peaches from one tree. Provided the right varieties are planted in suitable soils and intelligently looked after, fruit-growing does pay in almost any part of Western Australia. But the question is constantly being asked by growers, What about our market a few years hence? My opinion is that the only way to prevent a glut will be to plant varieties suitable for canning, drying, or export. The days are fast passing when 14s. can be obtained for a case of peaches, and it behoves those who are planting to have an eye for the future demand.

Pear-planting has been much more in evidence these past two years throughout the South-West district; and as the tree has proved even a more regular and larger cropper than most varieties of apples, the man who plants a good canning and shipping pear is not likely to regret his venture.

The fruit-fly is, fortunately, conspicuous by its absence south of Coolup and Pinjarrah. The growers in these two districts are making every effort to check or eradicate the pest, by destruction of the infected fruit.

CHAPMAN EXPERIMENTAL FARM.

By R. C. BAIRD.

I have the honour to present my report of the work done on the farm during the month of January, 1905. Threshing has been in full swing, and is now nearing completion. The yields so far have been very satisfactory. Sullivan's Early Prolific wheat gave a return of 14 bushels per acre, Silver King 12 bushels, Field Marshall 12 bushels, Rerraf 10 bushels, Australian Crossbred (13) 18 bushels, Steinlee 18 bushels, Australian Crossbred 1/J 12 bushels, Alpha 16 bushels. The heads filled well, and the grain is fairly plump. Alpha is a very plump grain; and had it not been for a heavy storm in November, which laid this crop very low, I am sure the yield would have been much higher from this variety. A portion of the oat crop was threshed, which gave a return of 28 bushels. There are still three varieties of wheat to thresh and the balance of the oat crop, the returns of which I shall give in my general report of the yields.

The new thresher, with tread-power combined, although somewhat slow, is working satisfactorily.

The summer crops sown in September last are still affording good feed for stock. These crops were grown in the Leg of Mutton paddock, near the river; an area of about 14 acres being put in. Twenty-five sheep and three horses were put on it on the 15th December, and have been on it ever since. The Millets, being the earliest to mature, were the first the stock attacked, and they are now pretty well eaten down. The Early Amber Cane, which is later in maturing, is now at its best, the saccharine matter having developed sufficiently to make it palatable to stock. Had this crop been put in three weeks earlier I think the results would have been even better. The Amber Cane reached a height of six feet in some places, while the average height would be about four feet. On the 31st January an area of 100 acres of new land had been cleared ready for next season's cropping, and a block of about 20 acres in the house paddock has been let for mullenising.

The new quarters having now been furnished, we are occupying them, and find them much more commodious than the old ones. The students, however, still occupy their bedrooms in the old house.

Student Gill, who has taken a farm in the Northampton district, left early in the month.

Student Foat has also taken a farm in the Chapman Area, and we shall lose him early next month.

Two windmills have now been erected. One in No. 5 paddock has been watering a large number of stock. This well is a very good one, the quality of the water being excellent. The water from this is also laid on to the small paddock across the road.

The mill in No. 19 paddock is also ready for use as soon as the threshing is completed, and stock can be put there. The water is also laid across the road to No. 18 paddock. The well at the house has almost given out, making little more water than supply the pigs and poultry.

STOCK.

The stallion season is now over.

Thirteen of our own mares have been served by "War Dance," including the light Suffolk mares; and 12 mares for various owners have also been served.

The stallion is in good health, and looking better than he did some months ago.

The Suffolk mares are doing very well, although lately they have lost a little of their condition, owing no doubt to the drying off of the grass, and the change of food and climate.

We have had four of the Suffolk mares at work. They are splendid workers. Some of them are rather nervous, and require careful handling. One of them, however, is quiet enough to work in the tread-power.

The cattle are in good condition, those that are not milking being fat. We are milking five cows at present. One of the pure bred Dexter calved in the early part of the month, dropping a heifer calf; and I expect another pure bred to calve in a few days.

The crossbred ewes are running in No. 5 and No. 6 paddocks. They are in excellent condition for this time of year.

The crossbred lambs are in Duty Bank paddock. They are looking fairly well, but will require a change of feed shortly.

The Shropshires are at present feeding on the Amber Cane. They are all looking well, some of them are rather fat for breeding.

The Angora goats are doing well. A number of the does have now young kids. The bucks are proving very troublesome to keep in the paddocks; they have started wandering since the hot weather set in.

The chief work on the farm for the month of February, after the threshing is finished, will be the winnowing and grading the seed for sale. I shall also start ploughing in No. 18 paddock to prepare some land for an early rape crop.

There are also some patches to be mullenised, to square up some of the blocks. This work will be carried out as soon as possible.

A GREAT APPLE COUNTRY.

THE HOME OF THE CHERRY.

The following interesting article on cherry growing is taken from the daily Press and is worthy of the notice of settlers, especially in the South and South-Western districts. The cultivation of the cherry in proper localities should be encouraged for all it is worth, and that is over £8,000 a year to this State:—

"The Broomehill-Kojonup road traverses an exceptionally fertile belt of country, which affords clear evidence of the productive capabilities of the district likely to be opened up by the proposed Katanning-Kojonup railway. For some miles the road we travelled passed through the Powell estate, a large freehold, the greater part of which is in a state of nature. The portions of the estate visible from the road are certainly of a prepossessing nature. Its parklike nature enabled one to form an opinion of the country for a considerable distance on either side of the road. Judged on this basis it can be claimed with some confidence that the property contains a large area of really superior land. In this respect, however, it merely maintains the average of a district which, taken throughout, has a high agricultural value.

THE APPLE INDUSTRY.

"In the Katanning-Kojunup district there are abundant indications of the fitness of the local lands for apple-growing. Wherever the apple tree has been planted it seems to grow prolifically, and, what is of more importance, gives heavy yields of wholesome fruit. At Marleeup, which is an old neglected homestead about 10 miles in an easterly direction from Kojonup, an apple tree over 40 years of age still bears a heavy crop. It has reached mammoth dimensions, and, though uncared-for and practically running wild, is in a most healthy state. So far as one can judge there is nothing special in the land on which this particular apple tree has reached honourable old age, while still retaining its reproductive capacity. There are thousands of acres on which the apple will thrive in the district through which the projected railway to Kojonup will strike. The prolificness of the younger trees and the hearty condition of the Marleeup veteran afford pleasing testimony to the fertility of the soil. They also indicate, on a microscopic scale, what may be expected of the apple industry throughout the district when satisfactory transport conveniences shall have been established.

MIXED FARMING.

"Nearer Kojonup the homestead of Mr. J. M. Flanagan is reached, and at a cursory glance it is plain that the owner has not lost time in developing his estate. Holding about 2,600 acres of land, of which 1,600 acres have only recently been acquired, Mr. Flanagan possesses seven well-fenced paddocks, which are palpably understocked with the 500 sheep at present maintained. Two hundred acres of chocolate fallow land tell of careful farming, and suggest bumper crops. Seventy acres in oats did not yield an average crop. The wet season was responsible for a return of only 20 or 25 bushels to the acre, a by no means good record for the Kojonup district. Mr. Flanagan has several acres of promising orchard conveniently arranged around his homestead, and altogether is the owner of a very valuable property.

FROM THE GOLDFIELDS.

"Passing on toward Kojonup we make a stay at a new farm held by the Liddell Bros., who have recently renounced goldfields life in favour of a more primitive form of existence. Mr. Liddell and his two grown-up sons are enthusiastic settlers, determined workers, and an acquisition to the district. The female side of the family is represented by a mother and several daughters, who warmly second their efforts. The sons regard the transition from the tainted atmosphere of goldfield reduction plants to the wholesome bracing ether of Kojonup with undisguised satisfaction. The combined holdings of the family reach 5,000 acres. Although they only arrived on the ground in the first days of 1904, they have partially cleared 200 acres, have erected a comfortable, if temporary, dwelling-house, and have otherwise made extensive improvements. Their main object is sheep farming, and as a commencement in that industry 500 sheep have just been acquired.

RETURNING TO THE LAND.

"Kojonup itself is a pretty little hamlet, built on pleasant undulating country. Its altitude is said to be somewhere about 1,700ft. above sea level, the highest elevation reached anywhere between Perth and Albany. The climate is bracing and healthy, and even in the hottest days of summer the temperature is by no means excessive. The old Perth-Albany coach road strikes through the midst of the village, and recalls the olden days when the at present neglected highway was the only road by which the metropolis of Western Australia could be reached. A few chains north of the township the old changing place, owned by the Chippers, who formerly ran the coach service, is found. Mr. McHenry Clark, a well-known Fremantle citizen, now occupies this historic spot and a considerable area of the rich lands which surround it. "Glenlossie" the new owner calls the old establishment, and the spirited manner in which he is undertaking certain important improvements indicates that he has come to Kojonup to stay. Years ago in South Australia Mr. Clark won his living from the land. After a period of years devoted to a successful business career he returns to his old love. Fruit-growing and sheep-raising are the lines which the owner of "Glenlossie" intends to pursue with vigour. Already his cherry trees have given an excellent account of themselves, some samples sent to Mr. Despeissis evoking the following excellent testimonial to the cherry potentialities of the Kojonup lands:—

"'Kojonup is, to my mind, one of the best cherry districts, and those who grasp that fact early are sure of finding its cultivation profitable.'"

EXPERIMENTS WITH THE FRUIT-FLY.

A SUPPOSED REMEDY.

PROTECTION OF ORANGES.

In a letter read before the Citrus Fruit-growers' Association in Brisbane recently, Mr. Wm. Main thus described his experiments in preventing the ravages of the fruit fly:—

"A few years ago, as most of you are aware, our friends, Messrs. Benson and Voller, carried out an extensive series of experiments in the orchard of Mr. J. O'Brien, at Sunnybank, with the view of preventing the fly from damaging fruit by means of various spraying mixtures. I need not say the work was well done, and hundreds of separate experiments were carried out with unfortunately disappointing results. Full details were published in the *Agricultural Journal.* Still, to me, it seemed that in spraying lay our only hope of success. Fly-proof netting has not proved a commercial success with us, and boiling the infected fruit, even in isolated orchards, has not prevented the fly from being produced in the bush, as it is, to my certain knowledge, produced in our district in such numbers as to make our efforts in that direction of no avail. When experimenting with my trees, in March of this year, I sprayed two "Beauty of Glen Retreat" mandarin trees with a new wash. Neither were large trees; but one, which I afterwards named my "test tree," carried over 25 dozen mandarins. Afterwards I also sprayed with the same mixture two "Glen Retreats," one "Canton," one round orange, and one "Jaffa." In March we had a rainfall of 8·12in., and I could not spray again till April. In April we had 2·50in., May 7·21in., June 5·50in., and July 4·75. This weather was, I consider, a very severe test of the permanent value of my mixture as a spray. In my orchard I have about one hundred "Glen Retreats," and during these months the fly did its work, and I saved only about thirty mandarin cases of fruit from the one hundred trees. Some of these trees had a crop that required supports to the branches to prevent breaking. The result, however, in the sprayed trees was astonishing. About the middle of June I invited the Under Secretary of the Department of Agriculture to inspect the fruit. This he did, and afterwards sent out Mr. Tryon to inspect and report.

The photographer of the department was also sent out, and a permanent record of the experiment was secured.

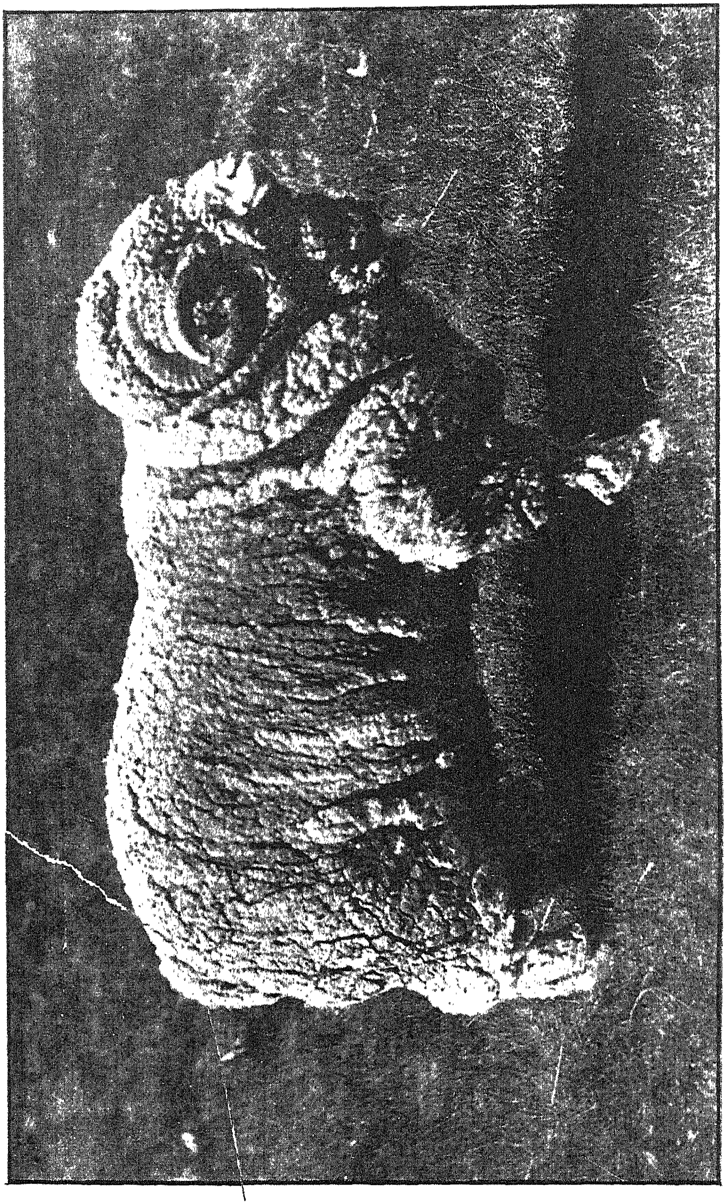
The wash that produced these results is McDougall's Insecticide Tree Wash, and the strength of the mixture used by me was 1½ gallons of wash to 40 gallons of cold water. The "test tree" was sprayed four times, say once a month, up to the date of inspection by the Under Secretary. One or two sprayings did not save all the fruit, but four sprayings saved every fruit as far as fruit-fly was concerned. My idea is that for citrus crops three sprayings would prove sufficient in any season. Last season was the worst for fly that I have known. With the exception of one plate of round oranges, the fruit exhibited by me at the National Association's Show in August was protected by McDougall's wash, and, as Mr. Benson awarded me two first prizes, it is evident this spray does not injure the fruit in any way.

I have observed in experiments with fly-proof netting that when a full crop is allowed to mature on the tree the result is a small crop the following season. The same result follows the use of McDougall's wash. The cure for this would be judicious thinning of the crop, which would at the same time improve the size of the fruit.

I may add that, although the fruit was hanging in clusters, and of course touching each other, there was almost complete absence of peach moth. Mr. Tryon, under the microscope, found one fruit on which an egg had been deposited, and I previously found another.

A light spraying is all that is necessary, and the care necessary when fighting scale pests is not required. The cost is moderate, and the wash simple, and not objectionable to handle. All that is necessary is to mix the wash in cold water, and it is ready for use.

Mr. Tryon, in the report above mentioned, states that on the occasion of his visit to Mr. Main's orangery at Sunnybank, that gentleman spoke of the excessive loss that he had experienced in his crop of mandarin oranges—especially of the variety known as Beauty of the Glen Retreat—through the attacks of fruit fly (*Tephritis Tyroni*). This testimony was supported by the statements made by a neighbouring fruit-grower, Mr. Fullerton, whose orange crop had also experienced similar depredations. In Mr. Main's orangery, which adjoins that of Mr. Fullerton, adult fruit flies were also present in considerable numbers. . . There, however, still occurred on Mr. Main's property two mandarin trees, one of which was still heavily laden with fruit, the other carrying a partial crop only. In each case this fruit appeared



Merino Ram "Mac."

perfectly sound, and to be quite uninjured by fruit fly. Neither were any examples of this insect present in connection therewith, although presenting to the eye characteristics that would, it is considered, be especially conducive to their occurrence. Though similar in other respects to those trees that had yielded but little fruit for the market, I noticed, with respect to these two, that each bore evidence of being sprayed some time since with special preparation, vestiges of which were still discernible upon both wood and foliage, with a greater degree of conspicuousness upon the heavy laden tree than upon that carrying but a poor crop. Moreover, it was elicited from Mr. Main that he attributed their favourable condition as regards marketable fruit to the fact that they had been subjected to the application of this special preparation that it was evident they had received; the greater yield in one case following a four-times repeated application instead of a single one, in the course of a tentative experiment. . . . . The trees appeared to have had a special quality bestowed upon them which served to deter fruit flies from visiting them, even when a considerable time had elapsed subsequent to the application of the preparation alluded to. . . . As is known, it was in the operation of a body endowed with such a property that, when writing of the fruit fly in 1889, I already suggested might be found the solution of the problem that the prevalence of this destructive insect has given rise to. The composition of Mr. Main's specific is not within the scope of this report; and in fact, it is for the time being a matter which obviously is not open for discussion. The question of its general availability for the prevention of fruit fly attack, also, cannot be dwelt upon in the absence of certain data not yet available. Even should its use be restricted within the limits suggested by the experiment that Mr. Main has undertaken, and its efficacy be maintained in further instances thereof, it should prove to be a discovery of considerable value to the horticulturist. —*Exchange.*

PRIZE STOCK.

The merino ram, "Mac," shown in the illustration, is a very typical specimen of the breed, and may be said to be one of the best merino rams in, Australia. He is a champion amongst champions, having won this high position in Melbourne, Geelong, Guildford (twice) and Geraldton. He was purchased by Mr. W. McKenzie Grant for the Newmarracarra Estate, near Geraldton. The shorthorn bull illustrated also belongs to and was bred on the same estate. He is a remarkably well-grown youngster, being only eight months old, and gives every promise of developing into a magnificent animal. He is sired by Earl Summerton 56th, out of Cherry, Duchess of Derrimut 15th.

THE PLACE OF FRUITS IN THE HUMAN DIETARY.

By DR. ABRAMOWSKI, Mildura.

The "Century Dictionary" defines diet, or dietary, as food considered in its relation to quality and effects. This naturally means that there must be different diets with different qualities and different effects upon our body.

The natural results, I take it, of the proper diet must be to feed our body properly, *i.e.*, to keep it in perfect chemical composition. This can be done only if the diet fulfils the following conditions:—

1. It must contain all the necessary building food for renewing all the tissues of the body, and all the necessary fuel-food for producing the right amount of heat and energy.

2. It must contain all those materials in their proper proportions, as wanted by the body.

3. It must contain all those materials in an organised form, easily digestible and assimilable.

4. It must not carry poisonous substances into the body, nor produce such while in the body.

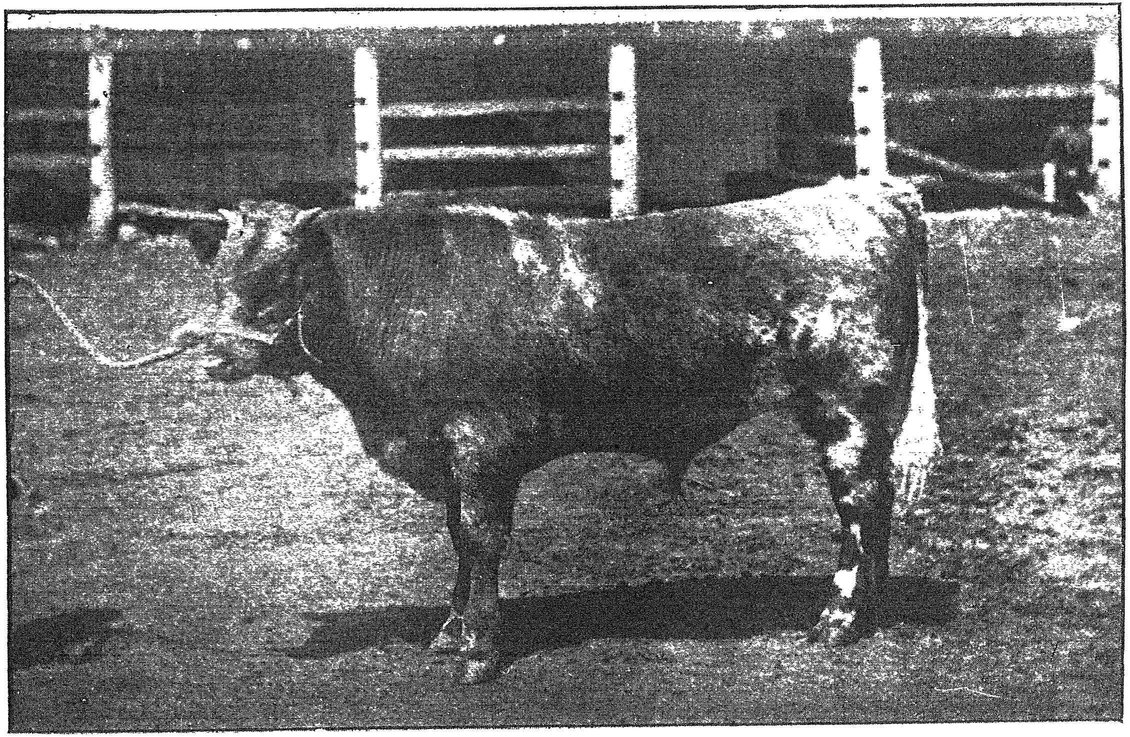
5. It must allow all the waste material to be freely and easily removed by the excreting organs.

6. It must be satisfying, and must not create any craving or desire for excessive food or drink.

Diets which do not answer to all these requirements must be harmful to our body, and it will be the object of the following research to point out where our present human diet is wrong; how humanity managed to render any wrong diet possible; what are the consequences of a wrong diet, and what is the remedy for these consequences. Human beings are, after all, only higher developed animals, and our bodies are composed of the same elements as those of these animals.

Animals do not have a diet. They have only one food, and they live on that food all their lives, never trying to change it under any circumstances, not even when starvation is threatening.

There is only one exception to this rule—our domesticated animals. Man has succeeded in altering their food to a great extent, and has made meat-eaters, like the cat and the dog, live on



Shorthorn Bull, Newmarracarra, "Summerton" (8 months.)

grain and vegetables; he has sometimes even fed grass-eaters on animal food.

How could he do it? By altering the natural flavour and structure of these foods to such an extent that the animals could not recognise them any more, namely, by cooking. A deer was by this means educated to eat meat and meat-soup from the same platter as the domestic cat. What was the consequence? The animal lost its gentle, trusting character, became ferocious and untractable, and died in about a year's time. Our domestic meat-eaters, cats and dogs, when fed on farinaceous messes change their whole character, as many a dog-owner knows, are subject to very many diseases, and do not live to their natural term of life.

INFLUENCE OF COOKING FOOD.

Man has made the most extensive use of cooking in his own diet. Cooking has enabled him to put the whole nature at the command of his stomach and to render things eatable and digestible, which in their natural state he never could have eaten.

The animal body has been compared to a steam engine, and a very illustrative comparison this is. An engine is built, let us say, from steel with brass fittings; it needs coal for fuel, water for creating steam or power, and air for keeping the fire up. If this engine wants repairing we could, in want of steel, do the repairs with soft iron, but would the engine then be able to stand the same internal pressure as before? Certainly not. And if we go on repairing that engine with soft iron instead of hard steel it will soon be unfit to do any work, if it does not break down suddenly by some unexpected catastrophe. But you might say, the fuel for this engine might be changed without doing harm to the engine. To a certain extent you are correct, but, nevertheless, an engine built to burn coal will not do the same work with wood, and if it is built for wood or peat, coal would be altogether too concentrated, and would eventually destroy the working parts of the engine by producing too much power.

Even the quality of the water and the draughts of air must be watched and properly regulated, or the engine will be damaged, and not do her work properly.

Now, what stands good for the steam engine stands good in all respects for that most highly developed and most exactly working mechanism—the human body. Our body wants absolutely the right building material, not deprived of any of its constituents; it wants the right fuel; it wants the cleanest water and sufficient pure air. Still we are daily and hourly trying to build and repair it out of spoiled material, and are even trying to heat it up by the wrong food. The water we drink usually contains all sorts of chemicals in solution, and pure air is very seldom insisted upon.

Our body is built upon a solid framework of bones, in and around which the soft parts are fixed. The bones, the foundation of our body, consist to a great extent of minerals, such as calcium, sodium, magnesium, potassium, iron, etc., in combination with organic matter.

The soft material forming our body is called albumin. This is the most complex matter chemists have yet found; an albumin-molecule often containing thousands of atoms. Living albumin is a soft gelatinous mass, like the white of eggs, and forms the main constituent of the so-called proteid bodies. In these latter bodies the albumin is always in combination with minerals.

Proteid bodies can be deprived of their mineral constituents through maceration in water, in salt brine, in vinegar, in alcohol, or any of the mineral acids, through heating, frying, roasting, and especially through boiling. These are the usual processes used in our kitchen, and are all comprised in the term of cooking. It is only natural that all these processes must interfere with the original condition of the albumin itself. Through cooking, the albumin loses not only the greater part of the mineral salts, but it loses the gelatinous nature, it becomes hard and changed, and although the body can still use it for repairs the effect of it will be the same as the effect of iron plates instead of steel plates on the engine. Supplied with such emasculated building material, our body is not able to stand the wear and tear of life; it is not able to stand the pressure of any sudden exertion, and, as with the engine, general weakness may render it gradually useless, or it may succumb to any sudden catastrophe.

The influence of cooking on the fuel foods, such as the different starches and sugar and fats, is not so deleterious as upon the building foods; still it is not beneficial for the life of the body, as it renders foods eatable which naturally are not meant for our consumption, and therefore are not so easily digested and assimilated, even after cooking, as the natural raw foods would be. There is no doubt that dyspepsia or indigestion is mainly caused by introducing into our stomachs starchy foods which were never meant as human food. The grain foods, for instance, such as wheat and barley, maize and millet cannot be digested by us in their natural state; they, as well as the legumes (peas, beans, lentils), must first undergo the cooking process before their starches are available for our digestion. And when they are used they serve our body as wood serves an engine built for coal; they can be burnt, and they are being burnt, but they do not produce the clean heat nor the amount of energy that the proper fuel would produce.

How the fruit juices are affected by cooking will get clear to you by some examples. You know that scurvy was the great plague of the seafaring people during the time from the 15th to the 18th century. It started when people left the coasting trade and went for long sea voyages, without touching land for weeks and months, and killed many a brave sailor before it was discovered that want of fresh fruit and vegetables was the cause of it. Limejuice was the sovereign remedy used against it. Now some people thought the citric acid contained in limejuice was the active agent; but this given by itself did not cure the disease. Then some people thought lime syrup made by cooking limejuice with sugar would be nicer to take, but it was soon proved absolutely useless. The cooking had destroyed its life-preserving properties.

Milk is in itself a complete food, and is the only natural food for the young of all mammals, man included. You know that calves will live and grow well on cow's milk, as it contains all the foodstuffs necessary; but if you feed calves only on boiled milk, and prevent them from getting any other food, they will not only not grow, but get weaker and weaker, and eventually die, and fade the quicker the longer the milk has been boiled. To find out what was the cause of their decline milk was artificially deprived of its food salts, and then fed to some calves; the animals died after some weeks. Then the necessary salts in their exact proportion were added again in the laboratory to the milk first deprived of its natural salts and calves fed on that, but they died in just about the same time. Calves fed on nothing actually survived those fed on milk boiled, or deprived of its natural salts.

Does not this prove that the mineral foods are not only necessary, but that they must be in a living organised combination, and that food without them acts like poison? A further result of these experiments is the fact that boiling does devitalise these salts only gradually, and that milk lightly boiled or scalded is not so dangerous as milk thoroughly cooked. However, boiling does reduce the value of the milk; still we will persist in boiling the milk for our babies, and then we cannot understand why so many of them get sick, suffer from diarrhœa, from rickets, and scurvy, why so many have trouble with their teeth, which, when they appear, are of a poor, brittle nature, and decay almost as quickly as they came; and why so many, viz., 45 per cent., of our children die before they are five years old?

Cooking has become more and more general, and more and more thorough, since the fear of the omnipresent microbe has filled our hearts, so that at last an up-to-date civilised human being will not put any food into his mouth which has not undergone the process of disinfection in the kitchen.

What are the consequences of this wholesale slaughter of our food? Our teeth have degenerated to such an extent that a human being with a healthy set of teeth is a very rare exception, and that we all more or less depend on our dentists for our grinders.

The hair has fallen out, and is disappearing from our heads in such a wholesale fashion that some far-seeing people actually prognosticate that after a short time of such further evolution the future man will be a toothless and a hairless animal!

Furthermore, it is not only the teeth and bone which suffer through want of food salts. The organised sodium salts in our blood have to carry off the carbonic acid, and when they are wanting the process of respiration cannot be properly carried on; the potassium salts are a necessary part of the blood corpuscles, and when they are not properly formed a state of malnutrition of the blood is created, which must have its influence over the whole organism. Dyræmia is the name of this deficient composition of the blood. The consequences of a state of dyræmia we see not only in the decay of teeth and bones, but in the palid features of our girls, in the chronic anæmia of our women, in that tired feeling which seems to have taken possession of civilised humanity, in those horrible effects of malnutrition called diabetes, consumption, and cancer.

There is one more point I want to mention in connection with the cooking. This process, in depriving the foodstuffs of their natural food salts, deprives them of all their taste and flavour. The cook is not slow to notice this, and therefore it is the endeavour of every cook to impart some artificial taste and flavour to the food. The ingredient mostly used for this purpose is the common kitchen salt or table salt—chloride of sodium. This stuff, absolutely inorganic and dead, cannot enter into any organic combination with the living cells of our body; it is taken in by the mouth, absorbed by the blood, and is discharged through the kidneys as quickly as it is applied. With the blood it has to go through the whole body, irritates everywhere, interferes everywhere with the usual natural processes, draws water from all the tissues, and creates an artificial thirst, which leads to an excessive wateriness of the blood with all its dire consequences.

The other condiments used, viz., pepper and mustard, vinegar and hot sauces, pickles and catsups, are working the same mischief as table salt; they irritate our stomach so much that it actually blushes, and their effects can be reduced only by copious draughts of liquids.

In this way a cooked diet leads to the pernicious habit of drinking during meals and after meals, and, if we follow the matter right up, we will find that alcoholism, with all its consequences, is only possible in connection with a diet of cooked and spiced foods.

Let us now shortly consider how far cooking of the food has injured humanity by allowing and enabling us to eat food which originally was not meant for us. As the natural food for every animal is offered by Nature in such a state that no preparation is needed, it seems to follow that if food substances are offered by

Nature in such a condition that they must be altered by man before he can eat them, that Nature did not want man to eat them, that there are perhaps some agents in these foods which do not agree with the human constitution, or that perhaps they contain veritable poisons.

You have all heard of uric acid and its near relations Xanthin, Hypoxanthin, etc., and of the mischief these agents do in our bodies. They are those organic poisons which are normally excreted with the urine, and which render this liquid more or less poisonous. Uric acid is produced during the life-process in the muscles, that is, in the flesh, of all animals, and is stored up in the flesh, the liver, spleen, and other organs. Cooking does not destroy this poison, nor is it destroyed in the stomach, but goes unaltered into the circulation. If this uric acid appears in small physiological quantities the blood can deal with it, can keep it in solution and have it removed by the kidneys. But if great quantities of uric acid are introduced with the food, the blood gets into a sort of gelatinous state, so thick and sticky that it cannot properly pass through the capillaries; consequently the heart has to work harder to keep the circulation going, and a state of high blood pressure, with all its disagreeable symptoms and dangerous consequences, is the result. Amongst these I will only mention diseases of the heart and blood-vessels, headaches, bilious attacks, giddiness, convulsions, epilepsy, apoplexy, etc.

Where, then, do we get this uric acid from? The foods containing this dangerous poison are exactly those which Nature did not want us to eat, or which are meant as food for other animals, and must be cooked before man can use them. More particularly they are: Meat and all its preparations, such as meat extracts, meat soups, gravies, etc. The legumes, such as peas, beans, lentils; the stimulating drinks, tea, coffee, cocoa. The proper diet should enable the body to get rid of all the waste materials and poisons quickly and easily, without any friction or disturbance of the bodily functions.

You all know the beautiful legend in the Greek mythology of Prometheus, how this junior God, in his love for mankind, stole the fire from heaven and brought it to the earth; how Zeus, in his wrath, punished Prometheus unmercifully by chaining him to an isolated rock and sent an eagle every day to tear out his liver, which grew afresh every day, and how the supreme God in his wrath sent the woman Pandora down to man with her box, out of which escaped and mixed among the human beings all the evils, the miseries and diseases which men had to suffer ever since. How beautifully this illustrates my idea! We all know that fire is the most potent factor for progress, but the wrong use of fire for the purpose of cooking food has been punished by an angry God with all the diseases that human flesh is heir to. But there is one ray of light in that darkness, and it is given in this very legend. Hope did not escape out of Pandora's box, but remained under control in the human hearts. And so let us hope that the rescue is near, that humanity will give up this thoughtless following of wrong habits, will give up the wrong use of fire for preparing natural food and find again her natural, proper food.

We have seen that a diet which wants cooking is a wrong diet. It thus follows naturally that our right diet will consist of food which we can eat in its natural state without submitting it to any process of cooking. This condition brings down the number of human foodstuffs at once to a very limited figure. Milk, we have seen, when taken raw, can serve as a useful diet for a limited time. But although the proper diet for young animals, it is not rich enough in iron for the adults; and besides, it is very indigestible for many people. We therefore cannot consider milk as a proper diet of man.

This process of exclusion leaves practically only the fruits of the trees and some vegetables to select from. Should these really be the natural food of man!

You know that by Darwin's theory man has evolved out of the higher animals, and comparative anatomy teaches that man in all his internal arrangements comes nearest to the highest monkeys, those called manlike, or anthropoid apes. These animals—Orang, Gorilla, and Chimpanzee—are so much like man that the difference between them and the lower monkeys is certainly greater—anatomically—than the difference between them and the lowest tribes of the human race.

What is the food of these apes? It is nuts and fruits, some green parts of plants, and a bird or small animal when they can catch it. But they are not carnivorous in the usual sense of the word; they could not make meat their main food. On this fruit diet these animals develop an immense strength, so that a gorilla can take it up with a lion, and an orang can fight unarmed five or six British sailors.

Now let us see how far a fruit diet will correspond to the demands we made on a proper human diet.

The nuts—almonds, walnuts, chestnuts, cocoanuts, Brazil nuts, hazelnuts, peanuts, etc., contain more albumen and fat than meat, and this free from any deleterious or poisonous matter. They contain mineral foods too, combined with the albumen molecules, and full of vitality, but not so much as the soft fruit, and therefore it is always desirable to combine nuts with fresh fruit. The latter contain only small amounts of albumen, but a great amount of fuel food in the shape of fruit sugar, which is the form to which all the other sugars and starches must be brought before they are taken up by our system, and small quantities of easily digestible starch.

The quality and proportion of the different food materials in a fruit diet are absolutely ideal, as long as the fruit is eaten in its natural state, and by a suitable selection they can be so arranged that they can supply everything wanted in our body in perfect combination. As for the digestibility and assimilability of the food materials in a fruit diet, there is, according to my own experience, no diet more congenial to the human digestive organs.

Much has been said and written about the indigestibility of nuts, but this mostly by people who have eaten nuts on top of a heavy dinner and blamed them for what the previous foods had done. I must say they have not once disagreed with me during my two years' trial, and when after eggs I felt repetition, and after milk a heaviness in the stomach, and after bread fulness and acidity, after nuts I just feel perfectly comfortable and satisfied. But they must be properly masticated, or, better, grated before eaten, as there are very few people now living with teeth strong or healthy enough to properly chew the nuts.

The acid and subacid fruits are simply an ideal food for the natural human stomach, and for the whole human body, and our natural instinct will prefer them to any other food, as we can see by our children, who will gladly give up all the meat and cooked messes for a dish of strawberries or cherries.

Are the fruits properly assimilated? Well, the proof of the pudding lies in the eating. I have worked on pure fruit diet in the hottest time of summer for six hours at a stretch, digging my garden, and done all my professional work and a great deal of reading, etc., besides, without feeling tired, and without losing weight, after I had once reached my normal weight. My digestion, my energy, and my spirits were all the time better than they were on the usual mixed diets; in fact, they were improving every day. How could this have been if the fruit were not properly assimilated? As for poisons in the fruit, certainly there are some poisonous fruits, but they are not included in our diet. The nuts are more neutral than milk, and there are no deleterious substances at all in them. But some of the soft fruits seem to have sometimes a peculiar effect on some people. Strawberries, for instance, sometimes cause a nettlerash. I consider this an absolute sign of ill-health in the individual. I am sure such a person must be so full of uric acid that the innocent strawberry, which renders the blood more alkaline, produces this rash simply trying to drive the uric acid out of the body. After a thorough fruit cure this person would be healthier and could eat strawberries like anybody else.

Some persons will get stomach-ache after eating fruit. Well, this is simply a matter of not being used to fruit. In changing from one diet to another, our digestive organs must get used to the new food, and they always take a certain time over this business. But with a little perseverance we can easily overcome this weakness, and then there are enough different fruits to choose from, so that we can always avoid those that do not agree with us.

During the process of digestion no poisonous substances are developed from nuts or fruit, and their influence on the bowels and other deprivating organs is such that the action of all of them is freed and promoted.

Fruit, thanks to the great quantity of the purest water it contains, satisfies not only hunger, but also thirst, and I must say that as long as I live on ripe raw fruit, I never feel inclined to drink, not even on the hottest day, and while working. This has led me to think that man, when under his natural diet, should not drink at all, and that anatomically and physiologically speaking, man is not a drinking animal.

As for satisfying properties, I must confess that a pure raw fruit diet seems to me the only one which gives me a direct feeling of satisfaction before I have eaten too much. It seems the only food in such natural relation to our instinct that we can depend upon our natural feeling, and do not want to wait for reason to tell us when to stop.

Since I have taken to fruit diet I have quite naturally and without great effort given up smoking, and a desire for beer or wine I feel now only when accidentally I have taken any meat or other cooked food. The advantages of raw fruit as an article of diet are so great that it should have a prominent place in every diet, not only as a carrier of the vital mineral foods, but also as an agent to get rid of uric acid. The alkaline salts of the fruit, and even the fruit acids, which are changed in the body into alkaline salts, keep up the alkilinity of the blood, and enable it to keep this poison in solution, until the kidneys have time to excrete it.

I should advise everybody to have at least one meal a day of fruit only, and have fruit in connection with the other meals as much as possible. Our ultimate ideal should be to live on fruit only.

It is the right of every human being to be healthy and to live to the normal term of life. Animals usually live five times as many years as they want to reach maturity. Man does not fully develop before he is 20 or 25 years; therefore his life should last from 100 to 125 years, and not 31 years as at present!

Fruit diet will stop the downward march of humanity and again render man healthy, superbly strong and happy, the king of all he surveys.

CODLIN MOTH PARASITES.

From files to hand we learn that Mr. G. Compére, the entomologist to the Department of Agriculture to this State, is doing work in collecting parasites of the codlin moth, as the following extract from the *California Fruit-grower* will show :—

"When it was announced some time ago that a parasite of the codlin moth had been discovered by George Compére great interest was at once manifested by fruit-growers. This new parasite—or rather, two species of them—have been received by the State Horticultural Commissioner. At the request of *California Fruit-grower* Mr. E. M. Ehrhorn makes a statement regarding this new parasite. He requests also that persons having larvæ of the codlin moth should send them to his office to be used in the work of breeding the new parasite. His statement regarding it is as follows :—

"The codlin moth parasite, which was discovered on the coast of Spain by George Compére, an agent of the State Commission of Horticulture, has arrived. There are two species of the parasite. One is a very large one, preying upon the larvæ or worm of the codlin moth. It is a wasp-like fly, with a very long ovipositor, so fitted that it can reach up under the loose bark and rout out the worms. It deposits its eggs on the worm of the moth and then gives the worm several quick, fierce jabs with its spear-like ovipositor to kill it. The larvæ of the parasite then uses the carcase to feed upon.

"What parasite Number 1 misses the smaller one sent attacks, as the codlin moth has passed into the pupæ form, and this small parasite lays its eggs in this form in the insect. As high as fifteen of these little parasites have been hatched from a single codlin moth. Both species have been received and are now in the breeding cases.

"In the section whence these parasites were sent the codlin moth is so scarce that it is hardly noticed, the per cent. of wormy apples being only from three to five per cent. Hundreds of old apple trees are hanging full of beautiful apples, and not a single codlin moth can be found, although nothing has been done to prevent the insects from spreading, and it has been known in that section for thirty years.

"The work of breeding the new parasites will commence at once in earnest and will be of the greatest benefit to the State and the fruit-growers who have suffered so severely from the ravages of the pest. It will mark an event for California and her method of insect control that will startle the world, as already numerous applications have been received from many apple and pear growing sections in other States asking how they may procure this parasite.

"Some time will necessarily be consumed before they are available for distribution, but the work of breeding them will be pushed along as rapidly as possible. But owing to the presence of secondary parasites which prey upon the main parasite the same as it does on the codlin moth, these secondary forms will have to be overcome before the parasite for the moth is liberated.

"This is simply according to the great plan of Nature. Each one of these secondary forms fills its place and constitutes a link in Nature's chain, one holding the other in check, yet none of them becoming numerous enough to become a pest is what we term 'the balance of Nature.' But where one form is introduced into a new country without the secondary form or parasite it soon becomes a terrible pest. It then becomes necessary to find the parasite, introduce it, and restore the balance.

"This new parasite is a species of the family of flies known as *Ichneumonidæ.* They breed very fast, and the greatest value is attached to this discovery, as by this means it is hoped to relieve the grower of the expense of costly sprays and have his trees produce more and better fruit.

"An enemy of the Red Scale (*Aspidiotus aurantii*) has also been discovered by Mr. Compére in Palestine, and the same is now being bred at this office. It is a ladybird somewhat resembling our *Vedalia cardinalis* parasite of the cottony cushion scale, and from the way it has attacked that scale in the breeding cases and from the reports of its work by Mr. Compére, we at last feel certain that the right enemy of this pest has been found.

"Several other species of Aspidiotus-feeding ladybirds have also been sent in, and they are now in the cases and will be sent out as soon as they commence to multiply."

With reference to the above, the *Garden and Field* thus comments:—

"Readers will recall that about 18 months since Mr. George Compére, who had then returned from a visit to Spain in search of parasites of the fruit-fly, announced that he had discovered a parasite of the codlin moth, which kept the pest in check in the district where he had discovered it. The Western Australian Government then invited the governments of the Eastern States to join in the expense of following up the alleged discovery, which was only of prospective value to Western Australia, because the codlin moth has not yet firmly established itself in that State. The invitation was declined; but later, when the news reached California, the authorities there asked to be allowed to share the expense of sending Mr. Compére to further investigate and to introduce the beneficial insects into California.

"Doubt is expressed by Australian entomologists on the value of the discovery; but considering the great interest at stake, it seems altogether unwise that the few score pounds necessary were not furnished by Victoria, New South Wales, Tasmania, and South Australia to test the matter fully as far as possible. None of the known means need be relaxed in the slightest while the value or otherwise of the parasites is being tested. However, the opportunity was passed, and California has taken our place as investigator. Mr. Compére has sent his parasites to that State, and from the *California Fruit-grower* of 12th November, we take the following account of their arrival and reception, and will await with the greatest interest the results of this, their latest, attempt to fight Nature with Nature's weapons.

"From the descriptions it would appear that the most claimed for the parasites is that they hold the pest in check, and reduce the loss to from three to five per cent. In order that the parasites may be available there must be moth larvæ and pupæ for them to work on, and in the natural order of things we shall find that under the most favourable conditions there will be rises and falls in the degree to which they will keep the pest down. In years favourable to the parasite the moth will be scarce, and following that it will increase again for a time. We advise all interested to watch results in California, with open and judicial minds; and, in the meantime, work the spray pump and other means for combating the pest."

INSECT PESTS.

At the Convention of Fruit-growers held at San Francisco in December last, Mr. Ellwood Cooper, the Horticultural Commissioner, thus refers to this matter in his address:—

"By and with the advice of the Governor an arrangement was made with the West Australian Government by which we have an interest in the services of Geo. Compére in his search for parasites. In this arrangement or agreement his movements are directed by the Horticultural Commission of California. It was, however, stipulated that Compére should first proceed to Brazil to obtain the parasite of the West Australian fruit-fly. This required several months for the search after the parasite and for collecting and carrying the same to the West Australian Government. I am happy to report that his voyage was a great success, and that the ravages of the West Australian fruit-fly will soon end and be practically harmless in that country.

George Compère was then ordered to Europe to investigate the codlin moth. It has been known for many years that this, our most troublesome pest, was not considered a pest dangerous to apple and pear growing in England, Germany, Spain, and France, hence the natural conclusion that there was an enemy keeping it in check. The discovery of parasites was not so difficult as many would suppose, especially to one of the ablest and most competent experts in this line of work known at the present time. Two parasites of the codlin moth have been sent over, and are now propagating in our office, No. 11 Ferry Building, San Francisco, to be sent to apple and pear-growers throughout the state. We have also received a valuable ladybird that keeps the red scale in complete subjection on citrus trees in parts of the Mediterranean coast.

It is incomprehensible, in the face of known facts and constant urgings, how this search could have been delayed until this late day. If these parasites prevent any serious destruction to apple and pear-growing in the countries mentioned, why should they not in California, or any other part of the world, and save the loss of millions of dollars annually?

It is the duty of fruit-growers to see that the Horticultural Commissioner is amply supplied with funds to carry on parasitic work. The pear blight is increasing and extending. The walnut blight is also alarming. It is my intention to have an expert investigate these diseases and find an inexpensive remedy. . . ."

THE FANCIER.—The Subiaco Poultry, Pigeon, and Cage Bird Society held their general meeting in the Subiaco Council Chambers on Thursday, the 9th inst. There was a very good attendance, and several new members were enrolled. The secretary reported that very satisfactory progress was being made by the society. The schedule for the show is now in hand, and a deputation will approach the Minister for Lands, *re* a "Laying Competition," on the 14th inst. A resolution was passed that the secretary write thanking the Subiaco Council for the use of the Council Chambers for the meetings of the society. A resolution was also passed that the society affiliate with the W.A. Dog and Poultry Association. Mr. McKie, vice-president, read an interesting paper on "Artificial Incubation," and, after questions, etc., the meeting ended with a vote of thanks to Mr. McKie for his paper. The next meeting of the society will be held on the 9th prox.

MARKET REPORT.

Messrs. Dalgety & Company, Limited, report as follows in connection with their daily sales of produce, held at Perth and Fremantle, for the week ended 10th February, 1905:—

Wheat.—London market is nominally 33s. per quarter of 480lbs, c.i.f. Melbourne and Adelaide markets are steady at 3s. 4d. and 3s. 4½d. per bushel.

Local Wheat.—Considerable sales have been reported from the country, on the basis of 3s. 1d. to 3s. 3d. per bushel, according to country stations. There is a good local inquiry for wheat in the Great Southern districts. Perth and Fremantle markets have been quiet at 3s. 5d. per bushel for prime milling wheat. On Friday two (2) trucks of milling wheat were offered at auction, but were withdrawn at 3s. 5d. per bushel, sales having been effected at an advance on this price. Smutty samples have been sold at from 3s. 2d. to 3s. 4d. per bushel.

Chaff.—Supplies have been coming forward irregularly, heavy yardings being catalogued some days, whilst at other times offerings have been light. The bulk of the arrivals have consisted of medium and indifferent chaff, the proportion of F.A.Q. and prime samples being small. However, during the last few days, the offerings of chaff have been considerably curtailed, with the result that Friday's market was much firmer for prime samples, although other grades showed no alteration. There is a good inquiry for prime green chaff, and we could readily effect sales at market prices.

Ruling rates are as follow:—

Prime green wheaten chaff, sound, limited supplies, £3 12s. 6d., £3 15s., and £3 17s. 6d. per ton.
F.A.Q., guaranteed sound, from £3 10s. per ton to £3 12s. 6d.; keen demand.
Medium wheaten, forming bulk of supplies, meets with a dragging sale at from £2 10s., £2 17s. 6d., £3, and £3 2s. 6d. per ton.
Inferior wheaten dull of sale, from £2 per ton upwards.
Oaten chaff in short supply, from £3 10s. to £3 15s. per ton.

We expect heavy consignments will come forward until March, owing to farmers selling to meet financial engagements. This will probably prevent prices from advancing just yet. Stocks of chaff at Perth and Fremantle, as a result of heavy consignments for the last few months, are very heavy, and it will be a matter of some little time before these accumulated stocks are worked off.

The general impression of the trade is that prime chaff is a rising market.

We are still receiving chaff at Perth and Fremantle for storage on growers' account, to be held for a stated time, and will be pleased to furnish particulars of charges on application; and, on chaff so stored, we will advance 75 per cent. of the market value.

Algerian Oats.—Melbourne market is very firm at 1s. 10d. to 1s. 10½d. per bushel, f.o.b., for feed lines. Our Adelaide branch could not quote Algerians yesterday. All reports from the Eastern States indicate a firm market for Algerians, and, in consequence of this improved position, Fremantle market has advanced to 2s. 8d. and 2s. 10d., f.o.r., whole and crushed. A fair quantity of locally-grown Algerians are still in farmers' hands, holders asking a higher price. At the present time, feed Algerian oats are worth from 2s. 4d to 2s. 6d. and 2s. 8d. per bushel, f.o.r. country stations, according to sample and distance from the metropolis.

Seed Algerians.—We have several good lines of "seed" Algerians for sale, which we can recommend to growers.

Pressed Hay.—There is no demand for feed, North-West contractors having purchased.

Straw.—No consignments forward; nominal value £2 per ton, at which price, during the week, we sold a few trucks.

Barley.—We have good inquiry for locally-grown English and Cape barley. This is a rising market.

KALGOORLIE.

Chaff Report.—Since our last report of 2nd instant the usual supplies reached Kalgoorlie on Friday and Saturday, but on Monday and Tuesday (6th and 7th inst.) there were very heavy yardings, which had the effect of lowering prices a little. Since then, however, daily arrivals have been more normal, and the market has recovered somewhat, and we expect that with a continuance of present conditions prices in Kalgoorlie will reach last week's limit.

Present values we consider about the following:—Prime green wheaten, from £4 12s. 6d. to £4 15s. per ton; good quality wheaten averaging £4 5s. per ton.

The demand for prime chaff has been fairly well maintained throughout the past week, although supplies were excessive. Inferior and medium grades, however, have been neglected.

STOCK REPORT.

Clearing Sale.

Messrs. Dalgety & Company, Limited, report having held the most successful sale ever held in the Eastern districts of this State of horses, cattle, sheep, farming implements, household furniture, etc., on account of the estate of the late S. Adamson, "Drumelyer," Beverley, on the 7th inst. There was a good attendance of local and outside buyers, and all lots met with keen competition at highly satisfactory prices.

Sheep.—804 comeback and crossbred ewes at £1 4s. 1d.; 460 crossbred weaners at 14s. 9d. to 15s.; Shropshire rams at £2 15s.

Cattle.—£12 10s. to £13 10s.

Horses.—Draught, to £48 10s.: medium draught, to £33 10s.

Pigs.—£5 to £8 10s.

Farming implements, household furniture and sundries at highly satisfactory prices.

Messrs. Dalgety & Company, Limited, report having held their usual fortnightly sale at their York yards on the 8th inst., when they yarded 561 sheep, horses, cattle, pigs, sundries, etc.

YORK.

Merino wethers at 13s.

Crossbred weaners, 14s. 6d.

Heifers, £6 2s. 6d.

Pigs and poultry at satisfactory prices; and outside, during the week, 106 porkers.

Messrs. Dalgety & Company, Limited, report having held their usual monthly stock sale at their Pingelly yards, when they yarded 1,367 sheep, 14 cattle, 32 horses, and 32 pigs. Competition for sheep was firm at full market rates.

PINGELLY.

Cattle.—A clearance was effected at satisfactory prices.

Horses.—Owners' reserves being above buyers' ideas, were difficult to sell.

Sheep.—Comeback ewes, to 18s. 4d.; do. do. (aged), 13s. 7d.; lambs (small), 10s. to 13s. 6d.

Cattle.—To £6 15s.

Horses.—Imported Clydesdale stallion "Marquis," £52; light delivery sorts, £25 to £27.

WOOL AND PRODUCE REPORT.

FREMANTLE, FEBRUARY.

Wool.—Some fair catalogues have been submitted since our last report, keen competition has been experienced, and values have improved fully five per cent.; crossbred and medium quality wools being most affected. Fleece, good quality, 8¾d. to 9⅛d.; fleece, medium quality, 8¼d. to 8⅞d.; fleece, inferior quality, 6d. to 7½d.; lambs', 5½d. to 6¾d.; bellies and pieces, 4d. to 5d.; locks, 1d. to 2½d.

Sheepskins.—Supplies have been well up to the average; full-wools are now practically finished, the bulk of our offerings being composed of short pelts and short wools, and these are in particularly strong demand, values having gradually risen, and at the present moment merinos are ½d. and crossbred, ¾d. per lb. higher than those ruling a month ago. Damaged lines have not improved to the same extent, but prices are firm. Good merinos, half to three-quarter wools, 6¾d. to 7¼d.; medium merinos, half to three-quarter wools, 6¼d. to 6¾d.; good merino, quarter to half wool, 6¼d. to 6¾d.; medium merino, quarter to half wool, 5¾d. to 6¼d.; fine crossbreds, quarter to half wool, 5¾d. to 6½d.; pelts, merino, fine crossbreds, 5d. to 6d.; pelts, merino, coarse crossbreds, 4¾d. to 5½d.; pelts, shearlings, 4¼d. to 4½d.; lambs', 5¼d. to 5¾d.; lambs', pelts, 4¾d. to 5¼d. In all cases where pelts of above sun-dried, weevil eaten, torn, or perished, prices are from 1d. to 2d. below quotations.

Hides.—Only moderate supplies to hand, and, owing to the strong market reported from the Eastern States, shippers have been operating freely, with the result that values for all sound conditioned lines have improved to the extent of ¼d. to ½d. per lb. Damaged lots are neglected and hard to place, except at reduced figures. Heavies, special, to 5¼d.; heavies, 4½d. to 4¾d.; medium and light, 4½d. to 4⅞d.; medium and light, dirty condition, 4d. to 4½d.; dry, 4½d. to 5½d.; damaged and cut, 3½d. to 4d.

Tallow.—This market, which has been very firm, is now much weaker, owing to unfavourable news from London; a fall of £1 per ton being reported during the past fortnight. Good mixed (in casks) to 20s. 6d. per cwt.; medium (in casks) to 19s. per cwt.; inferior, 17s. to 18s. per cwt.; tins and oddments, 16s. to 18s. per cwt.

Kangaroo Skins.—These have come forward in considerable quantities, but although at this season of the year the skins show a decided falling off in quality, only a slight decline in values has been noticed, and all offerings have met with strong opposition.

	Blue Skins. per lb.	Red Skins. per lb.
¾ to 1lb. average	2s. 5d. to 2s. 6½d.	2s. 2d. to 2s. 4d.
1 to 1½lb. ,,	2s. 2d. to 2s. 3d.	2s. to 2s. 2d.
1½ to 2lb. ,,	1s. 9d. to 2s.	1s. 7d. to 1s. 10d.
Extra heavy and very light weights	1s. 2d. to 1s. 8d.	1s. 2d. to 1s. 6d.
Damaged lines	1s. to 1s. 10d.	1s. to 1s. 8d.
Euro skins	1s. 2d.	1s. 2d. to 1s. 7d.
Brush kangaroo	1s. 3d.	

Horns, Hair, etc.—During the month some fair sales have been effected, and while the late extreme values for large have not been maintained, small and damaged lines are higher by 2s. to 3s. per 100. Horse and cow hair are firm at quotations.

Horns, large and fresh, 40s. to 42s. per 100; horns, small and fresh, 15s. to 17s. 6d. per 100; horns, stale and perished, 7s. to 12s. 6d. per 100; horns, very small, 4s. to 6s. per 100; rough bones, 3s. 6d. per cwt.; horse hair, 1s. per lb.; cow hair, 6d. per lb.

NOTES.

Seed.—We beg to advise farmers that we have for sale specially-selected lines of "English," "Cape," and "Skinless" Barley, also "Seed" Algerians.

Markets.—Farmers are invited to communicate with us with regard to market prospects for all lines of produce. In these times of low prices, the successful marketing of produce is most essential, and we are so situated that we can invariably assist growers to sell on the best markets.

Prime Green Wheaten Chaff.—We have buyers for 200 tons of prime green wheaten chaff (sound), and shall be glad to receive samples and quotations from sellers.

We would, at the same time, remind sellers that chaff is a rising market.

SPECIAL NOTE.

Wheat.—With reference to anonymous writings to the Press on the wheat question, Dalgety and Company, Limited, buy and sell farm produce on commission only, and do not hold at the present time a single bag of wheat on their own account, and claim to be the farmers' friend. We have cash buyers for wheat, and intending sellers would do well to communicate with us, stating lowest cash price. We have sold during the present season upwards of 30,000 bags of wheat.

Seed Algerians.—We have a line of very prime seed Algerians, guaranteed clean, which we can offer. These are some of the best oats we have ever seen, and those growers who are thinking of changing seed would do well to secure some of these oats. A few pence per bushel is a mere matter of detail where seed is concerned Intending buyers would do well to communicate with us early, and on application we shall be pleased to submit samples and price.

Algerian Oats.—We have cash buyers for good seed Algerians. During this year we have sold upwards of 4,000 bags of locally-grown Algerian oats.

GARDEN NOTES FOR MARCH.

By PERCY G. WICKEN.

Most of the hot weather will now be over, and in the coastal districts rain may soon be expected. Advantage should be taken of the dry weather to get the garden cleaned up, and all diseased leaves or plants burnt. All rubbish and refuse of all sorts should be put in a heap and well damped, so as to cause it to rot, it will come invaluable as a fertiliser later on. Any ground not in use should be dug up roughly and exposed to the sun as much as possible; this will help to sweeten the soil, and also to destroy some of the insects pests which are in a dormant state in the crevices of the ground. The deeper the breaking up is done the better, although it is not always advisable to bring the subsoil to the surface, but it should be just broken up and left, and covered with the next lot of surface soil; this enables the moisture as well as the roots of plants to penetrate deeper into the soil, and thereby to stand the dry weather better, as they are able to obtain the moisture from a lower level. Cultivators should be kept incessantly going during the month, the more the surface soil is stirred up the moister will be the ground underneath, and the better the plants will grow. Only save such plants as are true to name for seed, and be sure the seed is thoroughly dry before putting it away.

ASPARAGUS.—A bed of sufficient size should be prepared in good time for planting early in the season. It should be trenched 2ft. deep, keeping the surface soil on the top. Dig in while trenching a liberal supply of well-rotted farm yard manure and mix well with the soil. The soil should be left in a rough condition as it will then have a good chance of mellowing by planting time.

BEANS (French).—Except in a few of the warmer localities, this crop will be nearly over. In hot parts, where there is no danger of frost, a few rows may be sown.

BEANS (Broad).—This vegetable likes a heavy clay or strong loam soil, although it will grow and bear in most soils. It should not be sown before the end of the month, and the ground requires to be well broken up, and if poor apply plenty of stable manure. Do not apply nitrogenous manures. Bonedust, superphosphate, and potash are the manures which should be used. Sow in rows 3ft. apart and about 5 inches in the rows.

BEET (Red).—A few rows may be sown. Thin out the plants that are coming up from previous sowings.

BORECOLE OR KALE.—This is a plant which some like as a vegetable, and others do not think it worth growing. Seeds may be sown the same as cabbage, and plants put out. It yields a large amount of green stuff, which can be used for the table or for stock.

CABBAGE, CAULIFLOWER, AND BRUSSELS-SPROUTS.—Plenty of plants should be available from the seed beds, and they should be planted out as soon as the ground is moist enough. Plant in rows 3ft. apart and 2ft. in the rows.

CARROTS.—Sow for the winter. The drills should be 18in. apart. The seed takes some time to come up, and the weeds want looking after.

LETTUCE.—Sow a little seed to have a few plants handy for planting out when required; for garden use it is better to plant out only a few plants at a time and have them fresh than to plant a number at one time and perhaps have them wasted.

MELONS AND PUMPKINS.—Store away for future use all those that are sound, they will be useful later on; any dry shed will do to store them in.

SWEET POTATOES should now be ready to dig. They can be stored, and if kept in dry sand will keep good throughout the winter.

TOMATOES are getting scarce; destroy by burning or boiling all diseased fruits, to prevent the spread of disease.

PEAS.—In the cooler districts a few rows of peas may be sown. Work the ground well, and apply plenty of potash and manures.

TURNIPS.—Prepare as much land as you require for this crop, and as soon as the rain comes sow full crops. There are a great number of varieties to choose from in both white, yellow, and Swede varieties.

FARM.—Harvesting and carting, the results of the harvest, being now over, all the machinery used for the purpose should be overhauled and well oiled before being put away. All machinery when the season is finished should be put away in such a condition that it is ready for use at a minute's notice. Rust and exposure to the weather do more harm than actual use. Seed drills should be looked to so that they are ready for use at any time in case an opportunity occurs to sow some barley, etc., for early green feed. In sowing wheat early in the season, the later or slow-growing varieties should be sown first, as they then have a better chance of maturing early. If a very early variety is sown very early in the season, it often happens that it comes to maturity so early that the weather is very much against the harvesting operations, or, as happens in the Southern districts, the ground is so soft that it is impossible to take a binder on the ground, or if cut for hay the crop is deteriorated by getting wet after cutting. If sowing has to be done very late in the season, then sow the earliest variety of wheat you can obtain. If weeds have started to come up on land that has been laying fallow, it will require to have the scarifier over it to kill the weeds before sowing the wheat. All grain should be pickled in a solution of blue stone before sowing.

THE CLIMATE OF WESTERN AUSTRALIA DURING JANUARY, 1905.

This month was exceptionally cool in South-West districts, the mean maximum for Perth being one of the lowest on record. This summer will probably be gratefully remembered here on account of the remarkably long period of uninterrupted cool weather, lasting from December 21 to January 16, during the whole of which time the thermometer at the Observatory only once reached 80° (82·6 on December 26). This is the longest cool spell that has ever been recorded here. The present summer will probably be remembered in the Eastern States on account of the excessive heat waves, and it is probable that the same cause produced both our cool and their hot weather, for a succession of moderate "lows" travelled through Australia from our North-West coast in a more or less South-Easterly direction, and these brought severe heat throughout our inland and especially North-West districts and later in Eastern States, whilst the South-West corner of Australia was enjoying the cool breezes blowing from the higher pressure off the South-West coast towards the "lows" inland.

The effect of the sea breezes in modifying the temperature is again well shown in the mean daily maximum along an approximately East and West line. Thus between Rottnest and Southern Cross we find—

Rottnest	74·3
Fremantle	76·7
Perth Observatory	80·2
Perth Gardens	83·3
Guildford	85·0
York	88·2
Southern Cross	94·5

The value of Rottnest as a summer holiday resort is strikingly shown by the fact that the maximum temperature for the month was 83·2, whilst at the Observatory it was 97·1, and Guildford 102·1. On the other hand, it was even lower on the South coast. The mean maximum for the month at Cape Leeuwin was 73·1, and at Breaksea 68·6, and the absolute maximum at those places 79·5 and 75·0 respectively. The hottest place in the State from which records were sent is Marble Bar, in the North-West interior, where the mean maximum was 108·9, and the absolute maximum 120·5. The coolest nights were, as usual, experienced at Bridgetown, where the mean minimum was 49·8, and the absolute lowest 35·2.

Rainfall was considerably below the average in the tropics, whilst elsewhere it was very light. In fact, with the exception of a few coastal showers and scattered thunderstorms, no rain has fallen since the break up of the heat inland at the end of December.

The Climate of Western Australia during January, 1905.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						January, 1905.					* Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan 1.
NORTH-WEST AND NORTH COAST:	Wyndham ...	29·785	29·770	29·928	29·587	99·2	80·0	89·6	110·2	73·0	97·5	79·8	111·8	69·0	449	13	449
	Derby	29·835	29·796	29·965	29·692	94·6	77·7	86·2	100·0	70·0	97·1	78·5	107·5	70·2	535	13	535
	Broome ...	29·835	29·778	29·943	29·651	90·7	79·4	85·0	102·8	72·0	93·2	79·0	105·5	68·0	128	4	128
	Condon ...	29·803	29·780	29·941	29·650	92·2	76·9	84·6	104·3	71·8	94·7	76·1	106·5	65·0	15	1	15
	Cossack ...	29·784	29·767	29·942	29·655	98·6	77·0	87·8	107·2	69·0	99·4	78·1	113·4	71·8	Nil	...	Nil
	Onslow ...	29·802	29·780	30·000	29·614	97·6	72·7	85·2	117·0	63·0	97·4	73·5	117·0	63·4	48	1	48
	Winning Pool	...	..	...	...	...	...	...	...	...	...	...	...	...	Nil	...	Nil
	Carnarvon ...	29·883	29·833	30·016	29·689	84·8	69·6	77·2	90·9	61·8	89·0	70·0	113·7	58·2	Nil	...	Nil
	Hamelin Pool...	29·870	29·833	30·040	29·670	99·0	66·0	82·5	110·0	55·0	98·6	68·3	112·0	51·4	Nil	...	Nil
	Geraldton ...	29·961	29·909	30·095	29·706	78·6	61·6	70·1	98·3	55·2	83·2	64·0	111·2	49·8	3	1	3
INLAND:	Hall's Creek ...	29·809	29·810	29·968	29·680	102·0	76·3	89·2	109·0	64·8	99·1	73·0	110·0	50·0	147	4	147
	Marble Bar ...	...	...	...	...	108·9	78·2	93·6	120·5	66·2	...	...	...	...	237	6	237
	Nullagine ...	29·753	29·759	29·939	29·594	105·6	74·5	90·0	117·0	65·0	102·3	74·3	112·0	63·8	75	2	75
	Peak Hill ...	29·785	29·766	29·960	29·640	99·0	74·0	86·5	109·0	53·0	99·2	73·7	111·2	58·6	142	2	142
	Wiluna ...	29·786	...	29·899	29·621	98·7	72·4	85·6	110·3	54·8	...	...	...	...	177	2	177
	Cue	29·837	29·812	30·021	29·649	100·0	71·2	86·0	113·8	52·8	101·1	72·8	114·0	54·8	82	4	82
	Murgoo ...	...	...	...	...	...	...	...	...	...	...	...	...	...	Nil	...	Nil
	Yalgoo ...	29·871	29·826	30·012	29·624	98·8	67·2	83·0	111·8	54·0	99·5	68·7	114·0	54·0	7	2	7
	Lawlers ...	29·840	29·832	29·951	29·724	98·0	72·4	85·2	110·2	52·0	93·6	71·5	112·7	53·1	67	6	67
	Laverton ...	29·827	29·859	29·968	29·735	96·1	70·3	83·2	110·2	56·0	95·8	69·4	113·1	53·0	83	2	83
	Menzies ...	29·865	29·864	30·026	29·667	96·1	66·6	81·4	109·3	50·5	94·7	67·9	113·2	48·0	Nil	...	Nil
	Kanowna ...	...	...	...	...	93·5	62·9	78·2	110·5	49·0	...	...	...	...	17	2	17
	Kalgoorlie ...	29·890	29·904	30·121	29·664	94·4	63·3	78·8	110·0	49·2	92·9	64·2	114·4	47·1	26	2	26
	Coolgardie ...	29·894	29·902	30·108	29·659	93·2	61·6	77·4	108·5	47·2	92·7	62·5	113·3	46·0	46	3	46
	Southern Cross	29·900	29·879	30·110	29·705	94·5	59·9	77·2	108·2	47·0	95·0	62·7	114·7	44·0	43	2	43
	Kellerberrin ...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	2	8
	Walebing ...	...	...	...	...	88·3	57·2	72·8	105·0	46·4	...	...	...	...	10	3	10
	Northam ...	...	...	...	...	90·4	59·8	75·1	105·0	51·0	...	...	...	...	9	1	9
	York	29·953	29·924	30·122	29·726	88·2	56·8	72·5	105·2	48·4	93·6	61·0	111·0	45·5	7	2	7
	Guildford ...	...	...	...	...	85·0	57·7	71·3	102·1	47·0	88·6	59·6	109·7	46·8	12	2	12

* Averages for three years only.

The Climate of Western Australia during January, 1905—*continued.*

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					January, 1905.					* Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:																
Perth Gardens ...	29·982	29·939	30·149	29·804	83·3	61·4	72·4	99·0	51·8	86·9	62·6	112·0	46·0	14	2	14
Perth Observatory	29·994	29·950	30·153	29·822	80·2	60·1	70·2	97·1	51·1	84·2	62·9	107·0	50·6	16	2	16
Fremantle ...	30·012	29·957	30·155	29·851	76·7	62·3	69·5	96·5	52·2	79·8	63·6	108·0	51·8	6	1	6
Rottnest ...	30·008	29·939	30·157	29·849	74·3	63·0	68·6	83·2	56·6	76·9	63·8	102·2	52·5	8	1	8
Mandurah ...	...	...	...	...	80·3	58·8	69·6	95·0	41·0	84·1	59·7	107·0	43·3	15	2	15
Marradong ...	...	...	...	...	...	...	...	...	...	...	...	...	...	24	3	24
Wandering ...	...	...	...	...	86·4	51·8	69·1	101·6	40·3	...	...	...	...	11	3	11
Narrogin ...	...	...	...	...	82·7	53·0	67·8	99·5	45·0	...	...	...	...	14	2	14
Collie	...	...	...	...	82·2	51·9	67·0	96·7	39·0	85·6	53·2	103 0	37·7	45	6	45
Donnybrook ...	...	...	...	...	80·9	52·0	66·4	98·2	38·5	...	...	...	...	11	2	11
Bunbury ...	30·016	29·980	30·174	29·900	77·3	56·8	67·0	92·0	47·0	81·8	58·0	103·1	43·4	37	5	37
Busselton ...	...	...	...	...	79·5	52·6	66·0	92·0	40·0	81·1	55·1	99·2	41·0	29	6	29
Cape Naturaliste	30·014	...	30·179	29·853	72·7	57·8	65·2	83·6	50·2	...	...	...	...	15	2	15
Bridgetown ...	...	...	...	...	82·0	49·8	65·9	98·9	35·2	84·2	50·5	102·5	34·1	38	4	38
Karridale ...	30·022	30·017	30·110	29·770	73·9	56·8	65·4	83·0	42·0	75·2	57·0	98·0	42·3	66	10	66
Cape Leeuwin ...	30·007	29·986	30·180	29·720	73·1	61·5	67·3	79·5	54·9	72·8	61·8	91·6	51·0	53	11	53
Katanning ...	29·974	29·957	30·178	29·776	83·9	54·2	69·0	100·0	43·0	87·1	54·7	108·7	42·0	17	3	17
Mt. Barker ...	...	...	...	...	77·9	50·8	69·2	96·0	40·0	...	...	...	...	50	10	50
Albany	30·009	30·010	30·196	29·779	73·2	54·2	63·7	81·2	45·5	72·7	57·0	101·2	42·3	73	12	73
Breaksea... ...	30·011	30·000	30·230	29·700	68·6	58·4	63·5	75·0	51·5	69·2	59·0	91 6	46·8	48	16	48
Esperance ...	30·017	29·996	30·278	29·869	76·3	57·6	67·0	94·0	43·5	77·8	59·3	117·0	44·5	303	4	303
Balladonia ...	29·968	...	30·198	29·852	87·7	57·2	72·4	105·4	48·0	...	...	...	...	53	2	53
Eyre	29·934	29·991	30·117	29·609	78·6	61·3	70·0	107·4	45·4	78·4	59·0	112·0	41·5	57	3	57
INTER-STATE.																
Perth	29·994	29·950	30·153	29·822	80·2	60·1	70·2	97·1	51·1	84·2	62·9	107·0	50·6	16	2	16
Adelaide	29·943	29·937	30·197	29·547	87·4	62·3	74·8	109·7	51·3	86·6	61·7	116·3	45·1	151	...	151
Melbourne	...	29·831	...	...	...	...	...	...	...	78·1	56·4	111·2	42·0	...	...	...
Sydney	29·960	29·929	30·240	29·870	79·0	66·0	72·5	88·0	56·0	78·2	64·8	108·5	51·2	174	...	174

* Averages for three years only.

The Observatory, Perth, January, 1905.

W E. COOKE, Government Astronomer.

RAINFALL for December, 1904 (completed as far as possible), and for January, 1905 (principally from Telegraphic Reports).

STATIONS.	DECEMBER.		JANUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham	528	8	449	13
6-Mile	442	9	...	...
The Stud Station	683	9	...	...
Carlton	201	3	...	...
Rosewood Downs	...	...	...	...
Argyle Downs	...	...	...	...
Lisadell	...	...	...	...
Turkey Creek	224	7	437	11
Hall's Creek	125	5	147	4
Nicholson Plains	...	...	...	...
Flora Valley	...	...	...	...
Ruby Plains	...	...	...	...
Denison Downs	...	...	...	...
WEST KIMBERLEY:				
Obagama	...	...	...	...
Beagle Bay	..	...	...	...
Pt. Torment	100	1	...	...
Derby	94	7	535	13
Yeeda	...	...	...	...
Liveringa	...	...	..	...
Leopold Downs	...	...	...	...
Fitzroy Crossing	235	3	442	7
Fitzroy (C. Blythe)	..	...	...	...
Quanbun	...	...	...	...
Nookanbah	...	...	...	...
Broome	473	5	128	4
Roebuck Downs	386	5	79	2
Thangoo	...	...	...	...
La Grange Bay	191	5	182	5
NORTH-WEST:				
Wallal	15	2	54	4
Condon	32	3	15	1
Pardoo	29	2	...	...
DeGrey River	74	2	...	...
Port Hedland	13	2	11	5
Boodarie	80	1	...	...
Warralong	12	1	...	...
Muccan	3	1	...	...
Ettrick	88	4	...	...
Mulgie	Nil	...	...	...
Eel Creek	...	...	...	...
Station Peak	...	...	...	...
Coongon	...	...	...	...
Warrawagine	...	...	...	...
Bamboo Creek	200	11	85	4
Marble Bar	60	9	237	6
Warrawoona	246	5	118	2
Corunna Downs	166	4	...	...
Nullagine	170	10	75	2
Mt. Edgar	271	8	...	...
Kerdiadary	...	...	...	...
Roy Hill	81	5	...	...
Middle Creek	...	...	...	...
Mosquito Creek	176	7	...	...
Mulga Downs	316	5	...	...
Woodstock	...	...	...	...
Mt. Florence	180	4	...	...
Tambrey	316	4	...	...
Millstream	224	3	...	...
Yandyarra	...	...	...	...
Mallina	52	3	...	...
Whim Creek	84	3	2	1
Cooyapooya	92	1	...	...
Woodbrooke	63	1	...	...

RAINFALL—*continued.*

STATIONS.	DECEMBER.		JANUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST—*cont.*				
Croydon	...	...	...	...
Balla Balla ...	...	...	...	...
Roebourne ...	72	2	10	1
Cossack	21	1	Nil	...
Sherlock ...	35	1	...	...
Fortescue ...	70	3	15	1
Mardie	89	2	...	...
Mt. Stewart ...	...	...	...	...
Yarraloola ...	552	2	...	...
Chinginarra ...	175	2	...	...
Onslow	117	2	48	1
Peedamullah ...	250	4	...	...
Red Hill	711	3	...	...
Mt. Mortimer ...	238	4	...	...
Peake Station ...	392	4	...	...
Wogoola ...	391	4	...	...
Nanutarra ...	...	...	...	...
Yanrey	148	4	...	...
GASCOYNE:				
Winning Pool ...	112	2	Nil	...
Coordalia ...	...	...	...	...
Towara	348	3	...	...
Ullawarra ...	217	5	...	...
Maroonah ...	...	...	...	...
Gifford Creek ...	...	...	...	...
Bangemall ...	...	...	...	...
Mt. Augustus ...	...	...	...	...
Minnie Creek ...	179	2	...	...
Yanyeareddy ...	...	...	...	...
Williambury ...	190	2	...	...
Booloogooroo ...	...	...	...	...
Wandagee ...	165	1	...	...
Minilya	...	...	...	...
Bernier Island ...	Nil	...	...	...
Boolathana ...	27	1	...	...
Carnarvon ...	42	2	Nil	...
Brick House ...	44	2	...	...
Doorawarra ...	90	3	...	...
Bintholya ...	...	...	...	...
Mungarra ...	...	...	...	...
Clifton Downs ...	185	2	...	..
Dairy Creek ...	89	3	...	...
Upper Clifton Downs	130	6	...	...
GASCOYNE—*contd.*				
Dirk Hartog Island	..	...	...	...
Sharks Bay ...	5	1	Nil	...
Kararang ...	80	1	...	...
Meedo	90	4	...	...
Tamala	64	1	...	...
Wooramel ...	69	2	Nil	...
Hamelin Pool ...	20	3	Nil	...
Byro	122	3	...	...
Yarra Yarra ...	81	1	...	...
Berringarra ...	69	3	...	...
Mt. Gould ...	...	...	...	...
Moorarie ...	72	5	...	...
Wandary ...	121	3	...	...
Peak Hill ...	170	6	102	2
Horseshoe ...	109	7	...	...
Mt. Fraser ...	82	4	68	2
Abbotts	44	2	72	1
Belele	96	2	...	...
Mileura	39	2	...	...
Milly Milly ...	148	2	...	...
Manfred ...	56	3	...	...
Woogorong ...	40	1	...	...
Boolardy ...	Nil	...	...	...
Twin Peaks ...	42	1	...	...
Wooleane ...	191	3	...	...
Woolgorong ...	86	2	...	...
Murgoo	55	3	Nil	...
Yallalonga ...	72	1	...	...
Meka	204	2	...	...
Mt. Wittenoom ...	75	2	...	...
Nannine	62	4	74	3
Star of the East...	93	4	176	2
Annean	75	2	53	2
Coodardy ...	40	2	75	2
Cue	53	5	82	4
Day Dawn ...	28	4	71	2
Lake Austin ...	46	2	88	2
Lennonville ...	82	4	28	2
Mt. Magnet ...	31	1	65	2
Challa	22	2	...	...
Youeragabbie ...	118	3	...	...
Black Range ...	16	1	118	3
Murrum	45	1	...	...
Burnerbinmah ...	39	4	...	...
Barnong	162	3	Nil	...
Mellenbye ...	80	4	121	2

RAINFALL—*continued.*

Stations.	December.		January.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Yalgoo	61	3	7	2
Wagga Wagga ...	36	1	Nil	...
Gabyon	176	12	Nil	...
Gullewa	186	3	...	...
Muralgarra ...	...	...	...	...
Wydgee	89	4	...	...
Black Range ...	...	...	...	...
SOUTH-WEST DIVISION (NORTHERN PART):				
Murchison House	37	1	...	...
Mt. View ...	90	1	...	...
Mumby	50	2	Nil	...
Yuin	77	2	...	...
Northampton ...	74	2	Nil	...
Narra Tarra ...	104	1	...	...
Tibradden ...	100	1	...	...
Myaree	97	3	1	1
Sand Springs ...	98	1	...	...
Mullewa... ...	55	2	16	1
Kockatea ...	75	3	12	1
Bootenal ...	107	1	...	...
Geraldton ...	126	4	3	1
Greenough ...	152	3	3	2
Bokara	127	3	Nil	...
Dongara ...	106	3	1	1
Dongara (Pearse)	...	...	...	...
Strawberry ...	...	...	Nil	...
Nangetty ...	89	1	...	...
Mingenew ...	86	4	2	1
Urella	85	1	Nil	...
Yandenooka ...	...	...	...	...
Rothesay ...	98	3	...	...
Field's Find ...	80	4	...	...
Carnamah ...	127	4	12	1
Watheroo ...	129	3	Nil	...
Dandaragan ...	89	5	10	3
Moora	138	4	3	1
Yatheroo ...	79	3	...	...
Walebing ...	170	4	10	3
Round Hill ...	429	3	3	1
New Norcia ...	130	2	5	1
Wannamel ...	122	7	5	1
SOUTH-WESTERN DIVISION, CENTRAL (COASTAL):				
Gingin	87	5	8	2
Belvoir	37	2	18	1
Mundaring ...	69	3	...	...
Wandu	49	6	14	3
Guildford ...	21	4	12	2
Kalbyamba ...	18	2	...	...
Canning W't'r'w'ks	31	3	Nil	...
Perth Gardens ...	24	3	14	2
Perth Observatory	33	6	16	2
Subiaco	33	5	...	...
Fremantle ...	20	3	6	1
Rottnest... ...	13	3	...	...
Rockingham ...	30	4	20	2
Jarrahdale ...	62	4	20	3
Serpentine ...	...	...	13	3
Mandurah ...	4	3	15	2
Pinjarra	25	4	22	4
Yarloop	36	6	32	7
Cookernup ...	36	6	...	...
Harvey	50	7	32	4
Upper Murray ...	89	5	31	6
SOUTH-WEST, CENTRAL PART (INLAND):				
Hatherley ...	198	2	...	...
Dowerin ...	175	3	5	1
Momberkine ...	182	2	Nil	...
Monglin ...	216	2	...	...
Newcastle ...	136	2	6	1
Eumalga ...	137	1	6	1
Northam ...	153	3	9	2
Grass Valley ...	171	1	5	1
Meckering ...	189	2	2	1
Cunderdin ...	198	1	...	...
Codg-Codgin ...	193	7	4	2
Yarragin ...	134	6	67	2
Doongin... ...	167	3	...	...
Whitehaven ...	205	1	...	...
Sunset Hills ...	164	1	...	...
Cobham	156	6	9	3

RAINFALL—*continued.*

STATIONS.	DECEMBER.		JANUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST, CENTRAL—*contd.*				
Yenelin	205	2	...	...
Mt. Caroline ...	182	1	Nil	...
York	192	3	7	2
Dalbridge ...	180	2	2	1
Beverley ...	196	2	9	2
Bally Bally ...	202	2	13	2
Qualin	...	...	Nil	...
Stock Hill ...	142	2	...	...
Sunning Hill ...	235	6	4	2
Brookton ...	141	3	6	2
Wandering ...	32	4	11	3
Pingelly ...	132	4	14	1
Yornan	...	...	12	2
Marradong ...	75	4	24	3
Bannister ...	8	3	3	2
Wonnaminta ...	79	4	...	...
Narrogin ...	70	5	9	3
Narrogin State Farm	100	7	14	2
Wickepin ...	197	5	...	...
Gillimaning ...	131	6	...	...
Bunking ...	26	2	...	...
Bullock Hills ...	113	4	...	...
SOUTH-WEST DIVISION (SOUTHERN PART):				
Bunbury ...	13	4	37	5
Brunswick ...	...	...	42	5
Collie	48	6	45	6
Glen Mervyn ...	51	5	24	6
Donnybrook ...	52	3	11	2
Boyanup ...	52	3	...	...
Ferndale ...	31	3	...	...
Busselton ...	27	6	29	6
Quindalup ...	33	2	...	...
Cape Naturaliste	37	7	...	...
Lower Blackwood	67	4	65	4
Karridale ...	52	10	66	10
Cape Leeuwin ...	69	15	53	11
Biddellia ...	106	6	82	3
The Warren ...	125	9	160	10
Lake Muir ...	75	6	...	...
SOUTH-WEST—*continued.*				
The Peninsula ...	22	7	...	...
Mordalup ...	35	2	59	8
Deeside	56	5	74	7
Riverside ...	68	5	71	8
Balbarup ...	51	5	33	4
Wilgarup ...	75	9	...	...
Bridgetown ...	51	5	38	4
Westbourne ...	65	7	...	...
Hilton	18	1	32	2
Greenbushes ...	44	4	30	2
Greenfields ...	93	6	26	3
Glenorchy ...	37	3	...	...
Arthur	...	...	...	...
Darkan	10	1	...	...
Wagin	67	4	28	2
Glencove ...	120	6	24	3
Dyliabing ...	101	4	12	3
Katanning ...	93	5	17	3
Kojonup ...	95	3	14	3
Broomehill ...	119	4	15	3
Sunnyside ...	94	5	8	2
Talbot House ...	128	4	Nil	...
Woodyarrup ...	116	4	13	3
Mianelup ...	178	6	26	6
Cranbrook ...	31	3	...	...
Toolbrunup ...	81	4	21	3
Tambellup ...	87	7	15	5
Blackwattle ...	100	2	...	...
Woogenellup ...	135	5	...	...
Mt. Barker ...	61	7	50	10
Kendenup ...	52	5	21	4
St. Werburgh's...	102	8	...	...
Forest Hill ...	175	11	...	...
Denmark ...	108	5	108	6
Grasmere ...	96	10	94	12
Albany	99	10	73	12
King River ...	150	4	92	4
Point King ...	108	6	97	8
Breaksea ...	80	11	48	16
Cape Riche ...	237	4	...	...
Cherilallup ...	106	2	...	...
Pallinup ...	96	3	Nil	...
Bremer Bay ...	214	5	46	7
Peppermint Grove	219	8	55	9
Jarramongup ...	223	4	...	...

RAINFALL—*continued.*

STATIONS.	DECEMBER.		JANUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN DIVISION:				
Dural	46	3	...	...
Wiluna	57	4	177	2
Gum Creek ...	75	1	...	...
Mt. Sir Samuel ...	38	4	50	1
Lawlers	234	8	67	6
Leinster G.M. ...	116	1	61	2
Darda	56	3	151	4
Duketon ...	42	5	...	...
Mt. Leonora ...	59	4	32	1
Mt. Malcolm ...	75	4	40	1
Mt. Morgans ...	52	1	82	3
Burtville ...	Nil	...	...	...
Laverton ...	168	6	83	2
Murrin Murrin...	12	2	25	1
Yundamindera ..	Nil	...	26	1
Tampa	47	2	41	1
Kookynie ...	83	6	23	2
Niagara	93	3	46	2
Yerilla	70	5	41	2
Edjudina ...	78	5	Nil	...
Menzies	57	5	Nil	...
Mulline	31	5	40	2
Waverley ...	61	5	27	2
Goongarrie ...	144	5	18	1
Mulwarrie ...	221	5	23	3
Bardoc	84	6	17	1
Broad Arrow ...	93	6	23	1
Kurnalpi ...	91	2	41	2
Bulong	26	2	25	1
Kanowna ...	5	1	17	2
Kalgoorlie ...	31	3	26	2
Coolgardie ...	81	5	46	3
Burbanks ...	50	5	61	5
Woolubar ...	55	4	25	3
Widgiemooltha...	14	3	53	3
50-Mile Tank ...	Nil	...	41	1
Waterdale ...	24	2	...	...
Norseman ...	50	4	93	3
Lake View ...	58	2	67	2
Bulla Bulling ...	59	4	47	4
Boondi	74	3	78	4
Boorabbin ...	102	3	42	3
EASTERN—*contd*				
Koorarawalyee ..	74	3	51	1
Karalee	125	2	Nil	...
Yellowdine ...	170	3	Nil	...
Southern Cross...	88	1	43	2
Parker's Range...	136	6	38	1
Parker's Road ...	140	1	9	1
Mt. Jackson ...	124	3	10	1
Bodallin ...	102	2	Nil	...
Burracoppin ...	110	1	Nil	...
Kellerberrin ...	169	5	8	2
Merriden ...	176	3	...	...
Nangeenan ...	154	3	32	3
Mangowine ...	120	3	...	...
Wattoning ...	98	3	...	...
Noongarin ...	113	2	40	1
EUCLA DIVISION:				
Ravensthorpe ...	216	8	130	5
Coconarup ...	159	4	86	1
Hopetoun ...	197	3	68	3
Fanny's Cove ...	151	2	...	...
Park Farm ...	103	3	275	5
Esperance ...	195	3	303	4
Gibson's Soak ...	181	5	...	...
30-Mile Condenser	125	3	...	...
Swan Lagoon ...	131	3	...	...
Grass Patch ...	...	...	...	...
Myrup	180	4	244	3
Lynburn ...	112	2	...	...
Boyatup	249	3	...	...
Middle Island ...	143	1	...	...
Point Malcolm ...	97	4	...	...
Israelite Bay ...	63	5	127	5
Balbinia	193	3	...	...
Frazer Range ...	31	2	...	...
Balladonia ...	9	1	53	2
Southern Hills ...	47	1	...	...
Eyre	3	1	57	3
Mundrabillia ...	...	...	...	...
Eucla	Nil	...	25	2

The Observatory, Perth,
8th February, 1905.

W. E. COOKE,
Government Astronomer.

By Authority: WM. ALFRED WATSON, Government Printer, Perth.

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NOTES.

SEND-OFF TO THE LATE EDITOR.—A very pleasant little function took place at the Department of Agriculture on Saturday morning, March 4, when the officers assembled in the lecture-room to say farewell to Mr. G. Chitty Baker, who, after five years' service, has now severed his connection with the department. Mr. Baker has for some years past been editing the *Agricultural Journal*, a work which he carried out with conspicuous success. He has now followed the advice he so consistently gave to others through the columns of this publication, viz., settle on the land, and it was to wish him success in his new venture that the officers assembled. The acting director (Mr. Crawford) presided, and in proposing Mr. Baker's health, spoke of the able services he had rendered during his five years in the department, and the high respect and affection in which he was held by his fellow officers. In behalf of them he presented Mr. Baker with a purse of sovereigns, which he hoped would assist him in winning wealth and success from the soil. (Applause.) The toast was supported by Dr. Morrison, Mr. Despeissis, Mr. W. B. Hooper, and other old members of the staff, and unanimous testimony was paid to Mr. Baker's many good qualities. The toast was drunk with musical honours. Mr. Baker made a feeling response, in the course of which he expressed his regret at severing a long and happy connection with a body of officers who were not to be beaten by any department that he knew of.

It is especially requested that all correspondence in connection with the Department of Agriculture or *The Journal* be addressed to the Acting Director of Agriculture, and not to any individual. Correspondents, by complying with this request, will greatly facilitate the despatch of business.

THE ADELAIDE EXHIBITION.—Mr. P. G. Wicken, of the Department of Agriculture, who has been entrusted with the full charge of exhibits from this State to be shown at the Adelaide Exhibition, opening on the 20th inst., left for Adelaide on 7th March by the R.M.S. "China." A statement of the exhibits appears in this issue, together with an illustration showing the large calico sign which will be placed in a prominent position on the space alloted to Western Australia.

THE NEW ZEALAND GRAIN CROP.—The estimate of the New Zealand Agricultural Department of the yield of wheat, oats, and barley has been published. There are 258,015 acres under wheat, which, at an average of 27 bushels per acre, should yield 6,966,405 bushels. The 342,189 acres under oats is estimated to average 32 bushels per acre, giving a total yield of 10,950,646. The 29,484 acres under barley is estimated to average 30 bushels per acre, or 884,520 bushels. It is estimated that there will be an exportable surplus of 1,112,583 bushels of wheat.

INSPECTION OF APIARIES.—Mr. John Sutton, the bee expert, reports having inspected the South-Western district during February, and concludes his report with the following satisfactory remarks:—"The prospect, up to the present, points to one of our best honey flows. Bees generally doing fairly well in the South-West, except Wagin district, where the flow has not yet commenced. Round the Coogee district the early flow was greater than any previous season. Not a single case of Chill brood has come under my notice during the month, but the moth is very busy where attention is not paid to the hive."

TRANSFER OF HOMESTEAD FARMS.—Attention is drawn to a notice appearing in the *Government Gazette* under date of 3rd March, intimating that Transfers of Homestead Farms will only be approved of under special circumstances. The notice reads as under:—"It is hereby notified, for general information, that no transfer of a Homestead Farm will be approved in future, except under special circumstances, unless improvements to the value of £50, including the external fencing, have been effected on the land, or the holder thereof has resided upon same for a period of 12 months. A Homestead Farm is not transferable except to a person eligible to hold the land as a Homestead Farm, and any application for the conversion of such into a Conditional Purchase, for the purpose of a transfer, will render the land liable to forfeiture."

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the Minister for Lands has been pleased to approve of the following addition to the Schedule of 'The Noxious Weeds Act, 1904':—Stinkwort (*Inula graveolens*), Bathurst Burr (*Xanthium spinosum*), Nut-Grass (*Cyperus rotundus*), Prickly Pear (*Opuntia vulgaris*), and Spanish Radish (*Raphanus Raphanistrum*) to be Noxious Weeds under the Act throughout the State. If any local authorities who object to the Schedule will notify the Department accordingly, the Board will consider the advisability of recommending the exemption of such districts." These weeds are dealt with in a special article appearing in this issue, and illustrations are given of the Bathurst Burr, Stinkwort, and Nut-Grass, see p. 152.

AN EXPERIMENT IN DROVING.—"An important experiment is about to be tried of bringing 4,000 head of cattle from Ord River, Western Australia, into Queensland" (writes the *Queenslander*), "and the result will be followed with interest, as its success may probably mean the opening up of an important source of supply for re-stocking Queensland pastures that have been devastated by the recent drought. The cattle are to be taken from Mr. Hill's extensive run on Ord River, and the droving is to be entrusted to Mr. W. H. Rose. The trip from the Ord River to the Queensland border is expected to occupy four months." The experiment, if successful, should prove of vast interest to this State, as it will be the means of opening up a new market for the thousands of head of cattle now roaming over our Northern territory, and which under existing circumstances are for the most part shipped.

COLONIAL DAIRY PRODUCE.—Messrs. W. Weddel & Co., London, reporting on Colonial butter, under date of 3rd February, state:—The recent rise in values of both Australian and New Zealand butter has naturally met with little favour among buyers, who for a long time now have been hoping for a lower range of prices. Those holders who were trying to force New Zealands up to 105s. to 106s. per cwt. have failed, and this overstraining may result in a slight relapse. The markets for Danish butter in the North of England have shown no sign of increasing strength, and the official quotation, which a week ago was expected to be raised, remains unaltered. The total imports of all kinds of butter for last week were nearly 1,000 tons below the corresponding week in 1904, while the total imports for the last four weeks are only 2,000cwt. above the same period last year. The foreign imports last week was more than 13,000cwt. below what it was 12 months ago. Cheese: The spot demand for Canadian and New Zealand cheese remains in a somewhat quiet condition, but prices are well maintained.

SOW GOOD SEEDS.—It is not an uncommon practice amongst farmers to sell the best grain and retain unsaleable corn for sowing. Just so; we have seen this penny wise and pound foolish method adopted, and at once set our face against it. It is not the successful intelligent farmer who adopts such methods, but the man who thinks that anything will do, and unfortunately it is this individual who is usually so adverse to being taught better. To get good crops we must have good seed, no matter what we may be growing, and the Canadian Department of Agriculture has demonstrated that where precaution is taken to save seed on the principle of selection of the fittest, the practice is followed by a gradual increase in the yield instead of a decline where farmers save their own seed year by year without selection. We may add testimony to this statement by saying that we have saved seed from roots and other crops from time to time, and have proved the wisdom of only selecting the best types for seed bearing. Our leading seed growers are alive to the importance of this, and the moral is to go to the best houses for material for sowing purposes.

FARMING FAILURES.—In a recent article appearing in a leading London morning paper, Professor James Long made some pointed remarks about certain losses suffered by farmers through nobody's fault but their own, and as these provide food for careful thought we venture to refer to a few of the points raised. Speaking of manures, Professor Long says that in the use of animal and artificial manures, millions are wasted by the bad management of the former, and millions are lost to us by the illiberality of the farmers in regard to the latter. The writer then goes on to show how, by carelessness, neglect, and want of knowledge, losses are suffered in the management of animal manure, which is the gold dust of the farmer. The manure is heaped, becomes heated, and its most costly constituent, nitrogen, escapes as ammonia; it is exposed to continual rain, and valuable mineral constituents are washed out and find their way to the ponds and ditches close by. There is nothing very startling about this on paper, but we may depend upon it that the better management of manure will be a more important item of farming in the future than it has been in the past. The fact is we cannot afford to lose these fertilising forces through neglect or bad management, and farmers should realise that it is more economical to preserve the nitrogen in animal manure than to let it go, and replace the waste by buying nitrate of soda at £10 a ton. Worse still, perhaps, is it to waste the valuable mineral constituents of farmyard manure and replace them with nothing.

QUARANTINING OF IMPORTED SHEEP.—The *Mark Lane Express* of January 30 takes up the question of the period of quarantine enforced by the Australasian Colonies and New Zealand upon imported sheep, and advises sheep-breeders in England to take into careful consideration whether or not renewed efforts ought to be made to obtain a reduction of the period of quarantine. In support of their contention they put forward the following reasons:—"This quarantine is, we believe, generally three calendar months after arrival in the colony, which, added to the period of the voyage, makes fully 19 weeks isolation from any possible source of infection. Surely this period is beyond the bounds of all reason, and one that inflicts unnecessary expense upon the importer, and to a large extent curtails the demand. In spite of all this heavy expenditure, and the other drawbacks and the long delay caused by the lengthened period spent in quarantine, it is most satisfactory to note the increased demand that has been experienced during the past year from these colonies." As a matter of fact the assertion that the period of quarantine is three calendar months is incorrect as far as Western Australia is concerned. The period is 14 days, hence it cannot be looked upon as inflicting any hardship on the importer, as suggested in the above paragraph.

CODLIN MOTH.—Though we have not got this plague in Western Australia it will be interesting to most of our readers to know that Mr. George Compere, the State Entomologist, early in January of this year forwarded to the Californian Government 10 boxes containing in all over 1,100 moth parasites. In the February issue of the *Journal* we drew attention to the fact that Mr. Compere's search for the parasite of the fruit fly had been the means of awakening other countries to the possibility of combating with this and other kindred pests, and that the Californian Government had joined Western Australia in sharing the expenses of Mr. Compere's trip. It is gratifying to learn, through the *Californian Fruit Grower*, that Mr. Compere's researches, according to experts, will prove to be the long wanted remedy against this pest that causes so much damage to the fruit interests of California and other States. Illustrating the methods of this parasite in destroying the codlin moth, the above-mentioned journal says of it:—" It is not the adult parasite which destroys the codlin moth, but the larvæ or maggot. The adult female is provided with a long ovipositor which she inserts in the body of the moth and lays an egg there. This, later, hatches out and the young larvæ feed upon the body of its host, destroying it. The ovipositor of the female parasite is long enough to enable her to reach the moth which has spun a cocoon under the bark of the tree."

DO FARMERS PROTECT THEMSELVES?—It is the characteristic of the average Briton to clamour for a privilege till he has got it, and that end accomplished he rarely or never makes use of it. It is generally admitted that the adulteration of manures and feeding stuffs is considerable, and although a thoughtful Government has given the Western Australian farmer and gardener the privilege of having their samples analysed at a reduced scale of fees, as a means of protecting themselves against fraud, this privilege has not been availed of to the extent anticipated. The Government Analyst states that during last year he only received 37 applications for the analysis of fertilisers, and only half of this number were from farmers. One would naturally think that such an opportunity would be fully taken advantage of, but apparently, here, as in England, apathy reigns supreme. Have farmers such sublime faith in the integrity of dealers in artificial manures and feeding stuffs, or is it another case of sheer carelessness? The latter about describes the situation, and carelessness no doubt is answerable directly and indirectly for a good many losses in agriculture. It is absolute folly on the part of any farmer to purchase a fertiliser which does not contain the necessary component parts. What is the use of paying £3 or £4 per ton for a fertiliser that will only give about one quarter the results as compared with a fertiliser costing £5 or £6 per ton? Penny wise and pound foolish acts will only tend to keep the farmer in one position. By pursuing such tactics he can never hope to raise himself, neither can he expect a fair result for his labour.

FARM INSURANCE.—We live in the days of insurance, and this means of providing against the various ills which might any day befall us are within the reach of all. Insurance is looked upon as a means of saving money and making provision for old age. The wisdom of insurance is admitted by all, but many people are apt to overlook its advantages till the unlucky day comes when a calamity happens, and they find themselves with nothing to fall back upon. Should farmers insure their stock? The question is worthy of careful consideration. Owners of valuable pure bred animals usually take the precaution to do so, but many farmers are apt to trust to the kindness of Dame Fortune. The landlord insures his buildings against fire, and the farmer insures his own life, but very often when the dreaded fire comes, and horses are burnt to death in the stable, the landlord gets the value of his property, while the farmer has to bear the loss of his animals himself. Animals like human beings, run daily risk of death by accident and disease, and insurance companies are willing and anxious to do business in various directions. It very often happens that the loss of an ordinary beast is more to one man than the death of a pedigree animal is to another, and yet the latter is invariably insured, whereas the former is not. Moreover, there is a very comfortable feeling connected with the knowledge that one's life, property, and stock are insured, and if more people took this wise precaution of guarding against misfortune, there would be less need for sympathy with poor So-and-So when he loses a cow. In fact many a little man has been broken in farming through the loss of one or two beasts, and yet for the outlay of a few shillings a year such a disaster might have been averted. Indeed, it is not a bad idea to count insurance amongst the ordinary items of expenditure of the farm, such as rent, rates, and wages; and if a man never has the occasion to call upon the company, so much the better for him.

THE ASSISTANT GOVERNMENT ENTOMOLOGIST.

Amongst the passengers by the G.M.S. "Scharnhorst," which arrived at Fremantle from Europe on 6th March, was Mr. Frederick Lowe, who has been engaged, on the recommendation of the Government Entomologist (Mr. Geo. Compere), as assistant entomologist to the Department of Agriculture. The need of a second officer has been very pronounced since the Department adopted its vigorous entomological policy for the purpose of eradicating the farm and orchard pests of the State, as the protracted absences of Mr. Compere have left the Department without an entomologist, hence Mr. Lowe will take over the duties appertaining to his offices forthwith. It was also deemed imperative that a scientist should be available to receive and distribute the specimens sent back from other climes by Mr. Compere.

Mr. Lowe is a young man, who, although he comes from England, is enthusiastic over the possibilities of the new school of entomology forcefully represented in this State by Mr. Compere. The work of scientists and the principle of eradicating pests by the introduction of their natural parasites have received little attention in England.

Most of the entomologists at home are concerned in cabinet work, and there are but a few engaged in the field. Although he has had only a limited field experience his knowledge of cabinet work will be of great assistance to him in the more advanced labours with which he will in future be engaged.

Mr. Lowe has been engaged in entomological work ever since 1884, having commenced in the Natural History Museum and subsequently done practical work for Mr. Philip Crowley, Master of the Gardeners' Company, a gentleman who took a big interest in fruit pests. At that gentleman's decease Mr. Lowe returned to the Natural History Museum and worked under Mr. Theobold, the great mosquito expert, and engaged in the various branches of economic entomology.

Of the parasite system of combating insect pests Mr. Lowe says very little is known in England, because it has never been seriously tried under official auspices. "I am, however, convinced," he says, "that it is the only workable method of coping with insect pests. It is, of course, an extremely delicate work, and must not be tampered with by those who do not understand the subject, because there is the danger of introducing noxious parasites and also of getting the parasite of a parasite and thus doing damage to insects which you have been at great pains to establish. There are very few men who are thoroughly advanced in parasite work, but Mr. Compere is one of the originators of the theory, and I, as a result of my entomological studies, look upon it with a great amount of confidence. The system is condemned in some quarters, but mostly by people who know nothing about it, and it is a thing which cannot be condemned till it has had a fair trial. Entomological work is advancing with great strides, and extensive discoveries in connection with parasites are being made every year. In England we have very few field entomologists in the service of the Government, for their officers are mostly engaged in theoretical cabinet work, such as the identification and classification of insects."

Mr. Lowe said that he was astounded to see the fruit exhibited in the shops of Perth. It was a sight the like of which one did not get in England. It is his intention to set up a case in the Department's Museum, similar to that in the Naturalists' Museum, as by collecting local pests the farmers and orchardists would quickly become acquainted with their enemies, and by being able to apply remedies as soon as pests appeared they would have a better chance of eradicating them than at present when delays occurred owing to the necessity for first communicating with the Department.

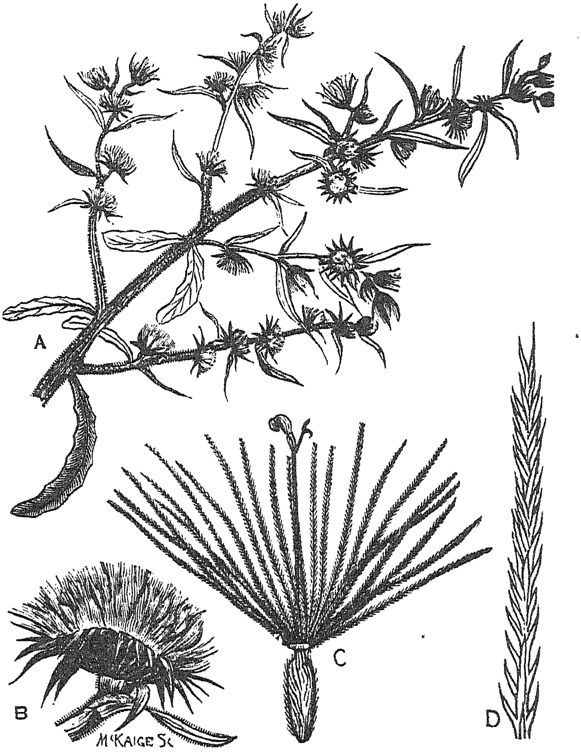
NOXIOUS WEEDS.

In the *Government Gazette* of 3rd March the following were gazetted as Noxious Weeds, and have been added to the schedule of "The Noxious Weeds Act, 1904":—Stinkwort (*Inula graveolens*), Bathurst Burr (*Xanthium spinosum*), Nut-Grass (*Cyperus rotundus*), Prickly Pear (*Opuntia vulgaris*), and Spanish Radish (*Raphanus Raphanistrum*) to be Noxious Weeds under the Act throughout the State.

In order that farmers and horticulturists may the more readily discern these weeds, illustrations representing three of the most important—also a description of all five—are here given. By carefully following the instructions given, much trouble will be saved to the State as a whole, in the prevention of the spread of these pernicious weeds.

STINKWORT (*Inula graveolens*).

Inula graveolens, the Stinkwort, is a plant of the natural order *Compositæ*, which is characterised by having numerous florets brought together to form the "heads" usually spoken of as the flowers, though of a composite nature. It is a much-branched annual, growing, under favorable conditions, to a height of several feet. The whole plant is covered with glandular hairs, that secrete a disagreeable viscid fluid. The lower leaves are oblong-lanceolate and imperfectly toothed, while the upper are narrow and shorter. The flowers are situated in the angles between the leaf and branch, and are in small heads that contain a large number of florets, of which those in the outer row are numerous and form a yellow "ray," which, however, does not extend beyond the tips of the more or less green involucral bracts forming the outer covering of the head. The anthers are joined together to form a sheath round the style, and are provided with very fine tails at the lower end. The small seeds or nuts, formed by each of the florets, are hairy, and bear at their upper end a pappus, or down, of numerous, nearly equal, barbellate bristles joined together at the base in a ring-like



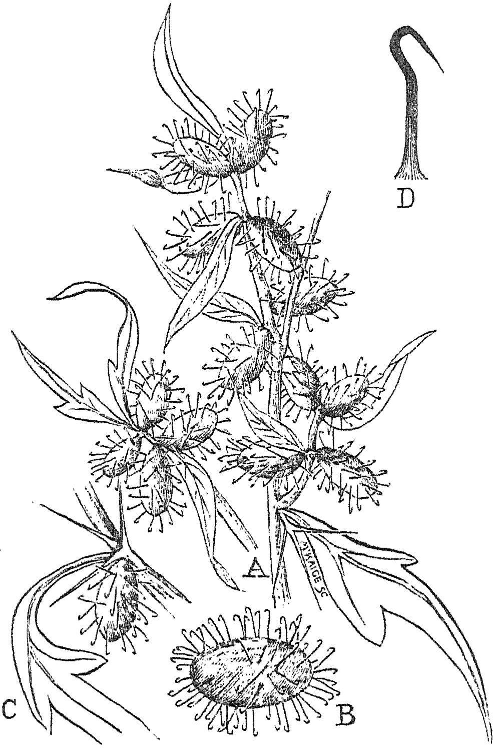
STINKWORT (*Inula graveolens*).

A. Branchlet showing flowers. Less than natural size.
B. Flowerhead. Much enlarged.
C. Seed with Pappus attached. Magnified.
D. Piece of bristle of Pappus, showing shape of Spicules. Magnified.

cup, below which the seed is constricted into a short neck. As each plant bears a considerable number of flower heads, each containing many florets, a large quantity of seed is produced, which is quickly shed, and, being furnished with down, is carried far and wide by the lightest breeze, thereby insuring its spread over a large area.

BATHURST BURR (*Xanthium spinosum*).

The genus *Xanthium* is generally placed in the natural order *Compositæ*, which includes, among many others, the thistles and burdock, but it is an anomalous genus, showing some affinities with the nettle and other distant families. The flowers are in heads, as in composites generally, but they are monœcious, the males and females being in separate heads on the same plant. The male



BATHURST BURR (*Xanthium spinosum*).

A. Branchlet of plant. Natural size.
B. Fruit or Burr, enlarged, containing seed.
C. Leaf, fruit, and spines.
D. One of the hooks on the burr. Much enlarged.

flowers are situated at the ends of the branches, while the females are placed lower down in the axils of the leaves, two florets being consolidated with the involucral bracts, so as to form an ovoid or oblong burr, from which the points of the bracts project as small spines with hooked points by means of which the burr attaches itself to wool or similar material.

Xanthium spinosum, Spiny Burweed or Bathurst Burr, is known from other species by the strong three-branched spines situated at the base of each leaf stalk. The leaves have a lanceolate blade with two short, more or less distinct, lobes near its base, and are grey and woolly on the under surface. The plant is a rigid annual and springs up afresh in the cool season wherever the burrs have been deposited, growing to a height of one or two feet. It is apparently of South American origin, and was first introduced into Spain, spreading from there over the countries bordering the Mediterranean, and now found in temperate and warm latitudes all over the world. It was first observed in Australia in 1852, probably at Bathurst, in New South Wales, from which town it has derived its Australian name.

NUT-GRASS (*Cyperus rotundus*).

The Nut-Grass, *Cyperus rotundus*, belongs to the natural order *Cyperaceæ*, or Sedges, which are most readily distinguished from the *Gramineæ* or true grasses by having solid, not hollow stems, and leaf-sheaths forming a complete tube round the stem, instead of merely clasping it with their edges free. The rushes, or *Juncaceæ*, on the other hand, though showing an outward resemblance, are known by the structure of their flowers, which are more highly developed and provided with a perianth or floral envelope, besides producing a number of seeds in a capsule instead of one only in the form of a small nut.

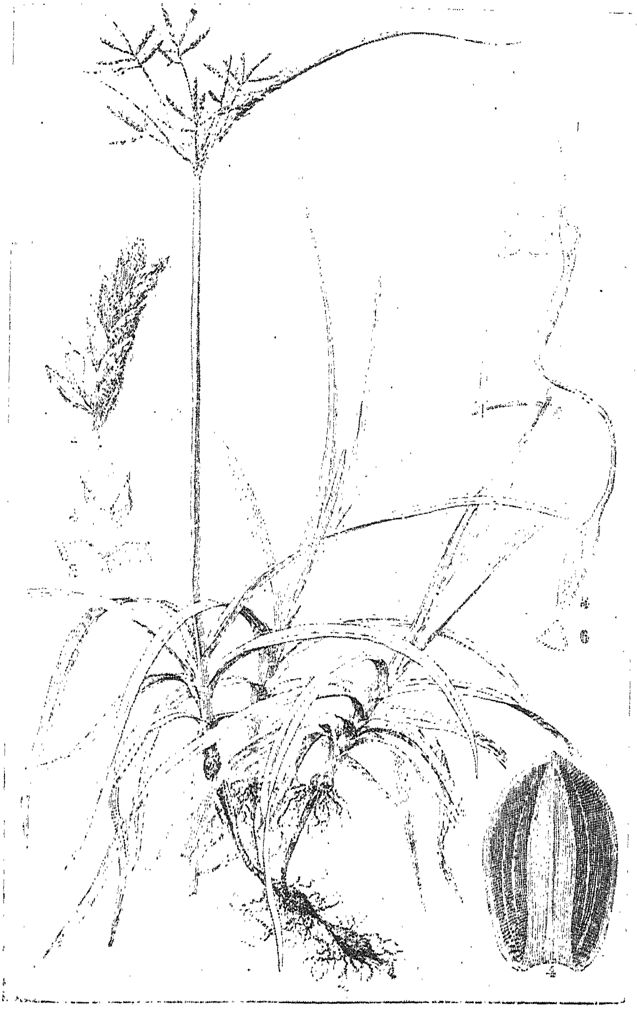
Cyperus rotundus is an erect plant with a creeping underground stem or rhizome on which are the tuberous swellings that have suggested the name, "Nut-Grass." The stems grow to about 18 inches high, and are three-angled near the top where the flowers are placed, while the leaves spring from near the root, and are shorter than the stem. The flowers, as in the true grasses, are arranged in spikelets springing in clusters from the summit of the stem. The spikelets are of a rich brown colour, narrow, pointed, and somewhat flattened, and contain a considerable number of little flowers. These are enclosed, as in grasses, within glumes or scales, having a prominent rib on their under side, and consist of only the stamens and pistil, the essential male and female parts, the latter producing the fruit containing a single seed, which is three-angled and less than half the length of the glume. Besides producing seed, the plant propagates itself by means of the "nuts" or tubers, so that in the course of time it forms a dense growth, and takes complete possession of the ground. It grows abundantly in most parts of the world.

In Queensland and New South Wales the Nut-Grass has been an especial source of nuisance to farmers and others, and very lengthy discussions have taken place at various agricultural society meetings with the main object of endeavouring to find some method of eradicating once and for all time this most pernicious weed. It is by no means a new evil. Homer mentions it, and in his day it was used as a component of horse-feed. Herodotus says that the Scythians used it for the purpose of embalming. Pliny and several other ancient writers refer to it in various ways.

In India it is held in great repute amongst native practitioners, and its efficacy has been vouched for in a severe attack of dyspepsia succeeding dysentery. If you scrape one of the tubers you will find that the flesh underneath is white, inclining to yellow. If you slowly chew this you will find that the taste is a most peculiar one, not remarkably unpleasant, and it is a little curious that, after a time, one gets to quite like the taste. It produces usually a somewhat peculiar sensation on the back part of the palate, as though through the liberation of a volatile oil. There is a sensation in the taste of very dilute turpentine, which, however, it is difficult to describe. The nut is said by native doctors in Bengal to have a most stimulating effect upon the mucous membrane, and to be so mild in its action that it can safely be recommended to persons suffering from acute forms of stomach disorders. It is also claimed that it has a marked effect in producing insensible perspiration. In the manufacture of scents the tubers are largely used in Bengal.

When one takes seriously in hand to conquer an enemy, the first thing is to become acquainted with that enemy's tactics, and so we will consider for a moment how Nut-Grass behaves itself, and what are the particular qualities which render it so objectionable to the horticulturist and farmer. During the winter months the tubers lie dormant, and in the spring, from these dormant tubers (so-called nuts), long white filamentous shoots are sent out. When the Nut-Grass has sent out two or three colonising shoots, it sets about flowering, and devotes itself exclusively to the particular business. When the business of flowering is over, the plant dies down, and all trouble with it is over for that year; but the nut at the base of the plant does not die. It is lying all the winter in readiness to send out its horizontal shoots the moment the warm feel of the earth tells it that it is time to begin its life business. It will never visit the sunlight again, but its children to be born next spring will, and it is ready to send them on their way.

It has already been said that, when the Nut-Grass begins to flower, it devotes itself exclusively to the matter in hand. This is its vulnerable point, because, if you prevent it from flowering, which is the cheapest way of interfering with it, the Nut-Grass at once sets



Nut-Grass (*Cyperus rotundus*).

1. Spikelet. Magnified.
2. Transverse section of flower stalk. Magnified.
3. Transverse section of leaf. Magnified.
4. Spikelet Scale or Glume. Magnified.
5. Fruit not fully ripe. Magnified.
6. Transverse section of seed. Magnified.

about repairing damage; and this it does, not by producing new leaves and flowers on the injured shoot, but by sending up a new shoot which has to draw on the old tuber for its initial start and the major portion of its support. The nut gets smaller and weaker, just as a seed potato gets weaker and shrivels when the shoots are sent above ground, and for the same reason. Now, if you stop the new shoot, the Nut-Grass will not give in by any means. It cannot. It simply sends up another shoot, sometimes two, but now ridiculously weak compared to the strong one which showed above-ground in the first instance. By systematically keeping down these shoots during the summer, the cold winter weather will further fight the battle for you. The energies of the plant are well-nigh exhausted, and it is a very sick tuber which goes to sleep that winter, and by no means up to the work of colonising, which it has to undertake the following spring. The next year you have an advantage over your enemy, but it is still necessary to continue cutting down the new shoots, for, if left alone, it would soon recuperate. Do not give it a chance to renew its youth. Your crop, whatever it is, requires cultivating for its own sake, even if there were no Nut-Grass in the world, and it will pay for the labour to do it on this account alone. If it can be arranged to have a crop which will shade the land just as the Nut-Grass is coming above ground in the spring, it will be a great point in the tactics against it. A crop of cowpea is good for the purpose of smothering it, though it must not by any means be imagined that it is only necessary to smother it for a short time. To deal with this enemy you must attack it with system. Happy-go-lucky methods only mean a loss of power and poor results, and it must be fought at the right time—*i.e.*, during the summer months, and until it begins to die away. Do not trouble about it during the winter months, but have your crops as far advanced as possible, or be ready with your cultivator when it makes its appearance above ground.

That it has not been tackled at the right time and in the right way "explains," to quote from a pamphlet of the United States Department of Agriculture, "the whole story of its universal triumph over the patience, sweat, curses, and blows of the millions who have warred on it."

THE PRICKLY PEAR (*Opuntia vulgaris*).

This large cactus is well known throughout Australia. In Western Australia it is found in many gardens, and, as far as I know, has not yet escaped on to pasture lands, etc. In New South Wales it is occupying thousands of acres, making the land next to useless for depasturing stock upon, and for a number of years the Government has spent large sums of money on its eradication with only partial success. It is one of the most difficult plants to kill, as the smallest parts of it will grow. It flourishes particularly well in dry regions, but thrives better on strong soil than in sand. Attempts have been made to utilise the plant as food by chopping it into bits, and in this manner breaking its sharp spines, when stock will eat it for a time.

Some time back the Queensland Government carried out some experiments in order to determine the efficacy of certain methods of destroying the prickly pear. They selected a block on Bunkers Hill, comprising 145 acres of the worst country in the Westbrook Area, for the experiment; the hill was very steep, and was covered with a dense and very high growth of prickly pear. Five men were engaged upon the work, and at the outset it appeared as if an almost hopeless task had been undertaken, but once a footing was gained the work went steadily on, with the result that the hill some months after showed not a vestige of the prickly pear.

The work was carried out thus:—The men, armed with special mattocks, and protected with leather leggings to the thigh, attacked the cactus, chopping it to the ground. The thickest leaves and the stem were then slashed with the mattock, and the stump was chopped to shreds, but not extracted. Then the leaves and stump were sprayed well with a solution of sodium arsenic, care being taken that the whole surface of the leaves were wetted, the spraying being carried out with knapsack spray-pumps.

This was the whole of the operation, and the result was surprising. After three or four days the green, succulent, fleshy leaves wilted and turned brown, finally drying up and cracking under foot like dry pea or bean pods. Not only were the leaves destroyed, but the spray so permeated the stump to the very end of its long roots that they were utterly rotted and turned into a rich humus. Singularly enough, the spraying had no bad effects upon the grass, which, on the contrary, seemed to derive additional vigour from the application. The whole area treated is now a valuable grazing property, covered with most luxuriant grass, intermixed with masses of beautiful wild flowers.

The preparation of the sodium arsenic is made as follows:—4lb. of white arsenic, 3lb. washing soda, in 1 gallon of water, boiled and stirred for half-an-hour; 5oz. to 8oz. of the solution were used per gallon of water in spraying.

THE WILD RADISH (*Raphanus raphanistrum*).

The Wild Radish (*Raphanus raphanistrum*), or the Jointed Charlock, better known in this State as the Spanish Radish, is an erect or spreading annual or biennial, one to two feet high, much branched, with a few stiff hairs on the base of the stem; leaves pinnately divided or lobed, the terminal segment large, obovate or oblong, and rough with short hairs, the upper leaves often narrow and entire; flowers of the size of those of the Charlock, the calyx very erect, the petals either white with coloured veins, or pale yellow or lilac; pod usually one to one and a-half inches long, nearly cylindrical when fresh, and terminating in a long, pointed or conical style; when dry more or less furrowed longitudinally, and often separating in joints between the seeds.

This is a common weed of cultivation throughout Europe and Russian Asia, except in the extreme north, and equally abundant in Britain; and the most simple way of getting rid of it is to pull the plants before the seeds are ripe, pile in heaps, and burn.

CALF REARING.

(Continued.)

By R. E. WEIR, M.R.C.V.S.

This is usually a simple operation, and one in which little risk is incurred, provided ordinary care and intelligence are used in the undertaking; but, from whatever cause inflammation is produced, losses may occur, and the mortality in some instances may be considerable. An experience of this nature recently occurred to one of our local farmers, when several well-reared calves succumbed to what was afterwards diagnosed as the results of castration. Inflammation had evidently supervened shortly after the operation had been performed, and, travelling along the course of the cord, had entered the abdomen, and very seriously inflamed the urinal organs and peritonium. The actual cause of the trouble in the first instance can only be attributed to the faulty manner in which the operation had been performed; and the lack of experience on the part of the owner accounts for the complaint not being recognised until my investigation had been made. Castration is usually performed when the animal is about three weeks old, and, when done at this age, the risk incurred is less than if performed when the calf becomes older.

After securing the animal (which may be operated on either standing or lying on its side) the scrotum must be seized, and a good open incision made, so as to expose the testicle; then separate the serous membrane where it unites, and pull the testicle out until the cord shows about four inches in length, when, by means of scarifying, a separation is made. The other testicle is afterwards treated in a like manner, and the operation is then complete. An instrument known as the "emasculator" has recently come into prominence, and, owing to its simplicity, commends itself to those who have much castrating to do.

No special treatment is required after the operation. The calves may be allowed to move about, a little exercise favouring the escape of any discharge which may remain, thereby preventing the too rapid healing of the wound.

Bleeding is rarely a source of trouble, but should any excess be noticeable, this may easily be stopped by means of plugging with disinfected tow. It may be from want of exercise that a swelling will appear in the neighbourhood of the wound. This can easily be remedied by giving the animal freedom and space to move about. Excessive swelling usually arises from the early closing of the outside wound and pus gathering in the cavity. Bathing the part with hot water, and opening up the wound with the index finger, will permit the free discharge of pus, and, when the wound has afterwards been cleansed with disinfecting fluid, a healthy healing should take place.

As already pointed out, peritonitis, or inflammation of the peritonium, may follow castration, either as the result of the wound being infected with some poisonous matter, or of discharge being retained. In either case, material of an infectious nature is carried upwards per medium of the spermatic cord, and eventually enters the abdominal cavity. Loss of appetite and stiffness in movement are the first noticeable symptoms; afterwards, restlessness and abdominal pains become apparent. The treatment consists in thoroughly cleansing the wound with warm water and disinfectants favouring, as much as possible, the free discharge of pus; this should be continued every four hours, until the animal shows signs of recovery. In the event of peritonitis having set in, the possibility of a cure is minimised.

(To be continued.)

THE GRAIN STANDARD.

By A. BUICK (*Morning Herald*).

The grain committee of the Fremantle and Perth Chambers of Commerce, together with Messrs. Fraser and Steinberg, of the Statistical Department, decided, on 16th February, upon the standard for this season's wheat, when the imperial bushel was fixed at 62lb. This test conclusively proves that we can produce wheat equal to any in Australia. Taken as a whole, the wheat grown in the Eastern District showed the best results. In other districts, also, some very fine grain has been garnered; but in some places this season's wheat, although carrying good appearance, lacks weight.

From Katanning some samples showed as high as 65lb., and Geraldton weighed up to 64½lb. These samples were grown from "Sullivan's Early Prolific." In other samples 62lb. and 63lb. was fairly common, a few getting down much lower, say, 58lb. and 59lb. Millers' samples, which varied considerably, showed a very high standard. On the whole the samples were excellent, and represented a very fine lot of wheat. The samples, which represented 13,000 bags, to be exported to the London market through the W.A. Producers' Union, were well up to the average standard.

Although the average decided upon was regarded as fairly representative of the whole State, the committee consider that the result would have been far more satisfactory had a larger number of samples been received. In all, 325 circulars were issued, viz., 300 to farmers and 25 to millers; and in response to these circulars the committee received samples representing 55,000 bags. The committee selected about 50 representative samples, care being taken to eliminate anything that might tend to unduly deteriorate the average.

The standard decided upon this year by the Adelaide Chamber is 63lb. for South Australian wheat, which is of exceptionally good quality.

The Melbourne Chamber has fixed the limit at 61lb., which represents the weight of an imperial bushel of this season's Victorian grain.

Sydney has decided upon 59½lb., or 1½lb. below that of last year.

The difference in average, however, is not expected to have any noticeable effect on the value of Australian wheat, which is always sold by weight or quality. The difference in weight between grain of one standard or another is practically adjusted by variation in values. It should be distinctly understood by farmers that this standard of 62lb., as fixed, will have no effect whatever upon the trade customs at present existing, and that 60lb. to the bushel for both buyer and seller within the State will be as heretofore.

MONEY IN CANDIED HONEY.

A novel experiment has been made by the A. I. Root Company, at Medina, U.S.A., in putting up candied honey in small packages for the retail trade, and it has turned out very satisfactory, as will be gathered from the following paragraph appearing in *Gleanings in Bee Culture* :—

"The gist of the whole matter is that the trouble of candied honey is overcome. The labour, trouble, time, and expense of reliquefying candied honey is done away with; and instead the honey is sold in the candied state, and that at a greater profit. Something worth thinking about, is it not? Whole cans of honey that have granulated solid are stripped of their tin, as it were, leaving a solid cake, which is then cut up into small oblong bricks weighing about 1lb. or a little over. Each brick is then wrapped in paraffine paper, after which another sheet of strong paper is put on. These are then placed in small cartons, and the whole (the carton with its brick of honey) is neatly wrapped in a beautiful wrapper of light-tinted paper, with appropriate printing in gold. This makes a dainty package of Nature's sweets that catches the eye of every person, and they sell like hot cakes, and at a fancy price too.

"So well did this way of putting candied honey on the market impress me that I actually wished I could be at my Texas home to give it a trial there. This being impossible, however, I hope that some of my bee-keeping friends may try it and report.

"It works all right here in the North; but I am not sure it will do so in our southern country; but I am inclined to believe it can be done; and as our colder weather generally comes during January, February, and March, I should like to call the bee-keepers' special attention to this matter, so that those who are in a position to do so may give it a trial. Of course, it does not get as cold in the South as it does in the Northern States, and the winters are not nearly so long; but honey granulates very readily, and becomes solid and hard, so that it can be cut up into bricks, as mentioned above, very readily. The only question that I see would be whether it would stand up during the warmer days. This could be solved by a thorough trial, however. Perhaps cold storage could be resorted to, which seems quite feasible."

The idea appears to be all right, but the difficulties to be overcome in Western Australia would be the warm weather and cold storage for those bee-farmers not living handy to the city. The experiment, however, might be tried on a small scale, and, if found practicable, would no doubt bring in good returns to the experimentalists.

HOP-GROWING AT THE HAMEL FARM.

At the latter end of February, Mr. G. F. Berthoud, the manager of the State farm at Hamel, sent the Acting Director for Agriculture, Mr. Crawford, some fine specimens of hops that had been grown on the farm as an experiment. In addition, he forwarded the following satisfactory report, together with a table showing the weight of hops obtained from 10 plants selected out of an average row:—

State Farm, Hamel,
24th February, 1905.

Acting Director, Department of Agriculture, Perth.

SIR,—I have the honour to report as follows on plot of hops on trial here:—

HUMULUS LUPULUS.

Sets planted 16th September, 1904, 6 feet x 6 feet apart; soil, low land of good quality, which retains moisture all summer, well tilled to the depth of 12 inches and fertilised with bonedust at the rate of 6cwts. per acre. The young plants made strong, healthy growth and bore a fine crop of well-filled burrs or fruit catkins, rich in lupuline. The results are made out from an average row, one chain in length, viz., 10 plants. Yield rate per acre 2,500lbs. undried, or about 800lbs. of cured hops. In suitable soil and favourable situation, hop culture, should prove payable in the South and South-Western districts. Attached are the weights, etc., from the 10 plants:—

HOPS (10 plants).

	ft.	in.		lbs.
1 pole, length of vine	20	6,	hops	2½
1 „ „ „	19	0	„	2¼
1 „ „ „	17	6	„	2
1 „ „ „	19	0	„	2¼
1 „ „ „	20	0	„	3
1 „ „ „	18	0	„	2½
1 „ „ „	20	0	„	3
1 „ „ „	19	0	„	2½
1 „ „ „	19	6	„	2½
1 „ „ „	19	0	„	2½

Hops ripe and ready for picking, 23rd February, 1905.

You will note that our dry summers are very suitable for ripening the hops.

GEO. F. BERTHOUD.

From the above, it will be readily seen that there is a big prospect for farmers in the South and South-Western districts. The Acting Director is well pleased with the experiment, and estimates that a gross return on the first season alone of from £40 to £60 per acre should be obtained. Under these circumstances, it would be distinctly to the advantage of settlers in these districts to devote a portion of their land to hop-growing.

That hop-growing would be a profitable undertaking is amply proved by the existing state of the market, as a perusal of the following paragraph will show:—"The hop markets of the world are universally strong, and the local market at the present time is not only exceedingly firm but in very light supply. Owing to the unsettled weather in Tasmania this season the hops are not burring satisfactorily, and it is expected that the new crop will be about 30 per cent. less than last year's, which, however, was above the average. Unless the weather during the next few weeks is favorable the falling off may be still greater. Supplies of new Tasmania hops are not expected to be available until early in April, and growers are generally asking 1s. 6d. per lb. The average Tasmanian crop is about 4,000 to 4,500 bales. The Commonwealth must depend upon Tasmania for supplies this season to an unusual degree, owing to the small extent of Victorian cultivation, and to the high prices ruling abroad, which remove New Zealand competition."

The *Mark Lane Express* of 6th February, on the subject of foreign hop markets, gives the following information:—

"Intelligence from foreign hop markets is comparatively unimportant this week. The American trade is quiet, buyers and sellers are both hanging fire, the first hoping to break down values by abstention, and the latter, and especially the growers, holding firmly to their previous demands, in view of the reduced stocks, and the requirements that yet remain to be covered. There is no alteration in recent current prices. In the Nuremberg market there is a remarkable absence of demand, consequently rather lower quotations are heard of for certain descriptions. The general tone of holders is, however, firm, and a comparison between the highest prices of the season with present figures show but little change, and when the difference in qualities then and now quoted is taken into account, it may fairly be concluded that the present position is quite as strongly in favour of holders as it was in October last. A little further export business is being done. In Burgundy the tactics of buyers has succeeded in shaking the firmness of holders, who, having realised 170 to 175 francs in December, are now very reluctantly releasing their small stocks at 155 to 160 francs. Very few hops remain unsold. The speculation market at Brussels is very quiet, quotation having given way a few points. The brewery demand is also limited, consequently the country centres report that not much business is passing, and as buyers are very reserved, there is a slight tendency towards reduction of prices."

A FOREIGN VIEW OF THE ENGLISH POSITION.

In a recent issue of *Le Petit Journal du Brasseur*, there appears a letter to the editor from one of the principal hop traders in

Belgium, of which, for the purpose of "seeing ourselves as others see us," I make a free translation as follows:—

"The calmness which has affected the various hop markets is being keenly felt in England, and has much surprised those who ventured, last October, to forecast the probable course of business. In the month of October the situation of the English market appeared to be far from satisfactory to brewers, and but for their indifference a panic might easily have been created. The report of the Board of Agriculture that had just been published stated that the crop did not exceed 282,330cwt., and the official statistics for 12 months ending 30th September, gave the brewery consumption as 629,000cwt. The stocks of old hops were not estimated at more than about 100,000cwt. The deficiency was therefore put at about 250,000cwt., without taking into account some thousands of hundredweights required for the manufacture of non-alcoholic beverages.

"It was consequently asked, in view of the unfavourable appearances of the German and Austrian markets, and the news, more or less, uncertain, which had come from America, how far it was possible for English brewers to find so large a quantity of hops. Some merchants or speculators interested in advancing the prices, and certain journals seeking to please their clièntele of planters did not hesitate to enlarge upon the situation thus presented. The anticipations of growers were thus greatly excited, they demanded very high figures for their produce, and many of them refused to accept current offers.

"But brewers refused to be alarmed. Quietly methodical in their operations, they took advantage of the opportunities offered in foreign markets. In Belgium, especially, we have been able to meet their demands. If our market has been momentarily excited, the direct cause has not been the English business. It has been caused by the action of our brewers and native speculators, who were alarmed by the deficiency created by the unusual extent of our exportations. The average prices at which English buyers have purchased our hops are relatively only slightly advanced upon, and should be even lower than what should be paid by Belgian brewers.

"Thanks to this methodical course of action, England has been able to import from the commencement of the season to 10th January, 215,000cwt., and continues to receive, notably from America, some thousands of hundredweights per week. The situation therefore appears very different from that which was presented three months ago.

"The consumption of hops varies to a certain extent inversely in proportion to the price. During the season of 1903-4 the values of English hops were comparatively moderate. It is therefore more than probable that during the present season the figure of 629,000cwt. may not be attained. We can therefore reasonably say that the problem—which appeared almost insoluble in October—is easily explained at present. The English brewers have achieved a victory over the speculators, to which, perhaps, they were guided by the example of the brewers of other countries.

"I leave these remarks for the consideration of my readers, and abstain from any comments thereupon, beyond remarking that although the writer has made statements regarding our past experience which may be accepted as fairly correct, he has not taken account of the immediate position, nor of the probabilities of the early future, which will doubtless entirely alter the feelings of those consumers who are now congratulating themselves upon their astuteness and their present triumph."

ADELAIDE EXHIBITION.

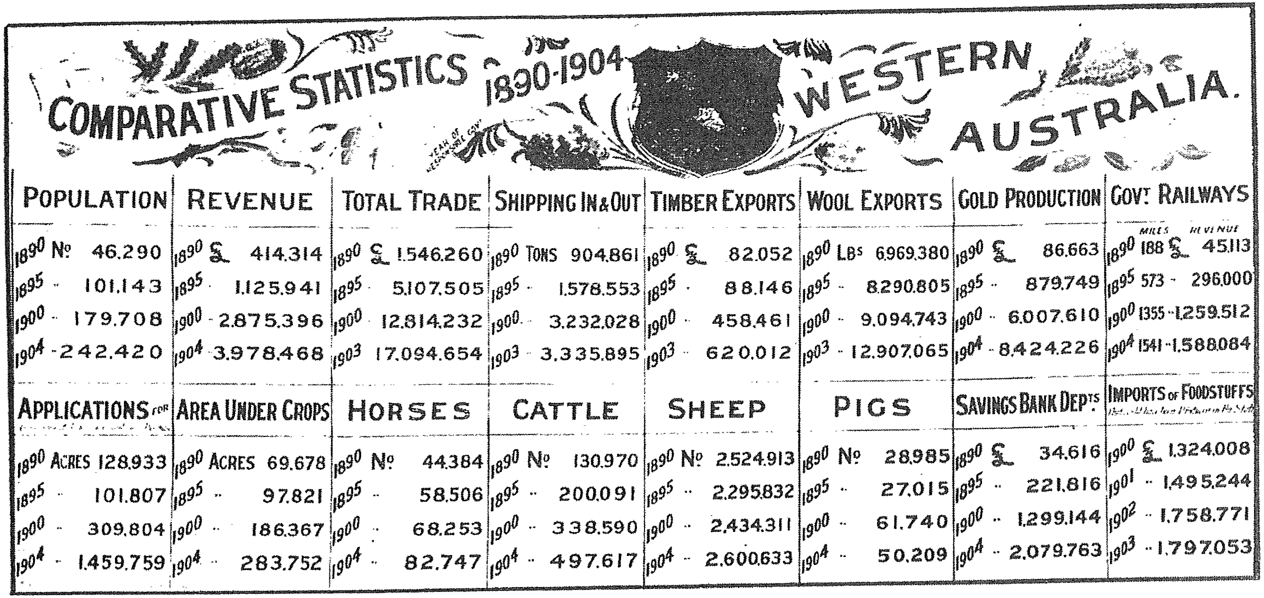
The accompanying illustration, kindly lent by the *Western Mail,* shows a table of statistics prepared by Mr. P. G. Wicken, of this Department, to be displayed at the Exhibition of Manufactures which is being held in Adelaide this month. The illustration shows the wonderful progress made by the State since the year of Responsible Government, immense increases having been made in nearly all lines. The only item to show a decrease is that of pigs, due, no doubt, to the outbreak of swine fever in 1903.

Twenty-seven packages of exhibits were despatched by the "Grantala" for the South Australian capital on the 4th inst., and in addition to this collection, the Government viticultural expert (Mr. Despeissis) has arranged to forward sample cases of local fruits at regular intervals, so that our court at the Exhibition will have additional attractions to those seeking information relating to this State. The officer in charge of the exhibit (Mr. P. G. Wicken) left for Adelaide on March 7. In addition to the practical evidences of the wealth and resources of Western Australia, Mr. Wicken is taking with him a quantity of literature dealing with land settlement, and giving general information about the State. These books will be distributed at the Western Australian court in the Exhibition, while, with his knowledge of the agricultural industry, Mr. Wicken will be able to afford additional information to inquirers.

The details of the Exhibition are as follows:—

AGRICULTURE.

A collection of 100 kinds of grain, comprising wheat, oats, barley, rye, maize, and peas, sheaves of wheaten hay, potatoes, samples of fruit, cotton, hops, etc. All these exhibits were grown at the State experimental plots at the Hamel, on the South-Western



COMPARATIVE STATISTICS 1890-1904 WESTERN AUSTRALIA.

YEAR OF RESPONSIBLE GOV^T

POPULATION	REVENUE	TOTAL TRADE	SHIPPING IN & OUT	TIMBER EXPORTS	WOOL EXPORTS	GOLD PRODUCTION	GOV^T RAILWAYS
							MILES REVENUE
1890 Nº 46.290	1890 £ 414.314	1890 £ 1.546.260	1890 TONS 904.861	1890 £ 82.052	1890 LBS 6969.380	1890 £ 86.663	1890 188 £ 45.113
1895 ·· 101.143	1895 1.125.941	1895 5.107.505	1895 ·· 1.578.553	1895 ·· 88.146	1895 ·· 8.290.805	1895 ·· 879.749	1895 573 ·· 296.000
1900 ·· 179.708	1900 ·· 2.875.396	1900 12.814.232	1900 ·· 3.232.028	1900 ·· 458.461	1900 ·· 9.094.743	1900 ·· 6.007.610	1900 1355 ·· 1.259.512
1904 ·· 242.420	1904 ·· 3.978.468	1903 17.094.654	1903 ·· 3.335.895	1903 ·· 620.012	1903 ·· 12.907.065	1904 ·· 8.424.226	1904 1541 ·· 1.588.084
APPLICATIONS FOR [illegible]	AREA UNDER CROPS	HORSES	CATTLE	SHEEP	PIGS	SAVINGS BANK DEP^TS.	IMPORTS OF FOODSTUFFS [illegible]
1890 ACRES 128.933	1890 ACRES 69.678	1890 Nº 44.384	1890 Nº 130.970	1890 Nº 2.524.913	1890 Nº 28.985	1890 £ 34.616	1900 £ 1.324.008
1895 ·· 101.807	1895 ·· 97.821	1895 ·· 58.506	1895 ·· 200.091	1895 ·· 2.295.832	1895 ·· 27.015	1895 ·· 221.816	1901 ·· 1.495.244
1900 ·· 309.804	1900 ·· 186.367	1900 ·· 68.253	1900 ·· 338.590	1900 ·· 2.434.311	1900 ·· 61.740	1900 ·· 1.299.144	1902 ·· 1.758.771
1904 ·· 1.459.759	1904 ·· 283.752	1904 ·· 82.747	1904 ·· 497.617	1904 ·· 2.600.633	1904 ·· 50.209	1904 ·· 2.079.763	1903 ·· 1.797.053

TABLE SHOWING THE POPULATION, TRADE, ETC., OF THE STATE—Prepared by Mr. P. G. Wicken, of the Department of Agriculture.

Railway; at the Chapman experimental farm in the Geraldton district; and at the Narrogin experimental farm on the Great Southern Railway.

FORESTRY.

Panels of each of the commercial woods of Western Australia, with leaves and flowers of trees carved on each panel. The woods include jarrah, karri, blackbutt, banksia, native pear, tuart, sandalwood, jam wood, morrel, York-gum, wandoo, she-oak, and red gum.

Some splendid specimens of carved jarrah furniture, showing the fineness to which this timber can be worked, are included, and the collection also contains a jarrah arm-chair, pair of ecclesiastical chairs, jarrah coffer or box, with carved panels on all sides, inlaid table showing the commercial timbers of Western Australia, design Maltese cross, jarrah cup carved from old pile 50 years in water; wooden book inlaid with Western Australian timbers. Also fencing posts, sleepers, etc., which have been exposed to the weather for a number of years; carved karri panel, representing Dolphin and Neptune's fork; carved jarrah panel, allegorical figure, "Defiance."

MINING.

A collection of 150 specimens of gold ores, copper ores, tin, tungsten, iron, nickel, cobalt, aluminium, zinc, lead, antimony, lime compounds, magnesia compounds, baryta compounds, lithia compounds, silicas, silicates, tantalates, phosphate, and carbon.

EDUCATIONAL.

Samples of works by lads attending the manual training classes.

GENERAL.

Specimens of work performed at Government Photo-Lithographic Department; samples of pipe used in Goldfields Water Supply Scheme, and locking-bar for same; relics of wreck of Dutch vessel "Zeewyk" (1727); aboriginal curios; first bicycle ridden to the goldfields; statistical sign showing the progress made by the State since the year of introduction of Responsible Government.

PHOTOGRAPHS.

A large collection of photographs of the State, illustrating the agricultural, pastoral, mining, timber, and pearling industries, as well as views of the famous caves in the South-West District; Goldfields Water Supply Scheme, railway workshops, locomotives and rolling-stock, aborigines, views of the goldfields; Perth, and places of general interest, as well as the principal buildings.

POULTRY NOTES.

By FRANK H. ROBERTSON.

WESTERN AUSTRALIA AS A POULTRY PRODUCER.

The question frequently crops up as to whether the State of Western Australia is a good one or not for poultry raising, especially when compared with the Eastern States. The sandy soil is stated to be unfavourable; the tick pest is an unsurmountable difficulty. The absence of grass, grit, and animal food are also adversely commented on; the so frequent occurrence of diseases stated to be unknown in other parts of the world; the climate is too hot, and so on. These and many other supposed disabilities are often quoted by the sceptical, timid, or unsuccessful as good and sufficient reasons why poultry raising cannot be carried on at a profit here. To my mind, however, such difficulties vanish into thin air when the proper means are taken to combat them; and, taking everything into consideration, I am decidedly of opinion that Western Australia is eminently adapted for poultry, and that when the details of management become better known, our production will be a very large one. The importations of eggs and frozen fowls will cease, and we will in turn become an exporter—how long it will be before such happens is impossible to foretell. The business will then be brought to a finer point, and profits are not likely to be so large or so easily made; but at the present moment, with our large importations and sufficient supply of locally-grown grain, the prospects for the egg-producer are most favourable, and must continue for a certainty as long as the importations continue.

SANDY SOIL.

The first objection, namely, the sandy soil, is a myth, as the proper ground to run poultry on in any numbers is admitted all the world over as best when of a light nature, as it does not retain the water in the rainy season, and does not become foul and evil smelling; it does not give the birds sore feet; it is easily dug up or ploughed, and post holes are quickly dug out, which means a great saving of labour in laying out runs. Good crops of greenstuff can be got off it, and such land can be bought at a low price. Sand is said to be bad for fowls. No doubt it would be if swallowed in large quantities, but that a little of it is liked can be proved by the fact, if water is thrown on to sandy ground, a few beakfulls are eagerly relished by some of the flock. Good rich soil is, no doubt, of advantage for poultry in respect to having a more liberal supply of animal food, grit, and greenstuff; but the advantages of the sandy soil, as above enumerated, far outnumber the former; and even if fowls are kept in large numbers the supply of worms, insects, and grass would soon be eaten up, so that these necessities would have to be artificially supplied.

GRASS AND GRIT.

This is just where so many people fail with their fowls. If they would only remember that hens have no teeth, and to masticate the food a grinding process takes place in the gizzard, and the harder and sharper the grit the better. Sharp ironstone or quartz, broken up into particles the size of a split pea or a grain of wheat, is about the size preferred by grown fowls, but for chickens smaller sizes are better. Water-worn stones are not the right thing, but if broken up answer well; nor do I consider it advisable to depend entirely on shell grit. The proper article is, in many instances, hard to procure; but with the aid of a grit mill any ordinary hard stone can be reduced to the required size. The greenstuff difficulty can also easily be overcome in summer time, with the exercise of a little forethought, by the cultivation of summer fodder. Pie melons, in particular, are very easily grown, and come to hand at the right time; and, even failing these, lucerne and clover chaff, when well steamed and mixed with the soft food, are excellent and yield a good egg production. If these are also unobtainable, good oaten chaff will do.

THE TICK PEST.

The fear of tick should not deter anyone from keeping poultry. If proper precautions are taken the evil effects of the pest can be reduced to a minimum. The details as to the best means of fighting it have been several times dealt with in the columns of this journal, and a pamphlet on the subject is obtainable free by application to this Department. Briefly stated, the use of tick proof fowl-houses and perches, which prevent ticks reaching the fowls when roosting, are the best safeguards.

ANIMAL FOOD.

Animal food is generally harder to get than in the Eastern States, but this matter can also be overcome if special arrangements are made with butchers, and if such is impracticable, various substitutes are obtainable, such as dried meat meal, greaves, crissel, dried blood meal, etc.

FICTITIOUS DISEASES.

Then with reference to disease, I am of opinion that our flocks are not subject to mysterious maladies which are unknown in other parts of Australia, neither are the ordinary well-known complaints, such as roup and cholera, worse than they are in Victoria.

HIGHER PRICES.

The important point, however, in making a comparison, is with reference to the great advantages that this State possesses as a successful producer of poultry products. The first is the fine prices obtainable here, especially for eggs, which for 1903 came out at from 9d. to 10d. per dozen higher on the yearly average than the Eastern States; the prices of feed here are but little higher. The prices realised for table fowls, ducks, geese, and turkeys are also much higher than in the other States; thus showing that the industry is also much more profitable here.

CLIMATE AND MARKETS.

As regards climate, this is where we score heavily, chiefly from the fact that, although on the whole it can be considered warm, there is almost an entire absence of the sudden cold changes that are so prevalent in Victoria, which play such havoc with young stock. Our climate in the middle of winter is quite mild and favourable to a profuse egg production.

Another advantage not at present appreciable is the geographical position of closer proximity to the markets of the world, when an export trade is developed. In the meantime we have excellent markets within our own borders, both in the metropolitan area, and also on the goldfields.

THE COMPARISON.

The comparison, briefly summarised, will thus be apparent that our chief advantages are, firstly, much greater profits, and, secondly, superiority of climatic conditions. The disadvantages are scarcity of natural animal food, greenstuff, and grit; but as these can be artificially supplied, the advantages, taken all round, to the poultry raiser in Western Australia, place him in a much more favourable position than his Eastern neighbour.

HOW TO START KEEPING POULTRY.

Many settlers are now taking up land who purpose making poultry raising a source of income, but as many cannot make up their minds, or do not know enough about the matter, in regard to breed or breeds to take up to make the best profits, a few remarks on the subject may be of service to some of my readers.

In the first place, most selectors, when they take up land, think of nothing but getting it cleared as soon as possible; the idea of keeping fowls seldom enters their heads, and if it does, a prompt decision is come to that poultry can be got when things are made ship-shape, the land cleared, and the first crop in. Now this is just the wrong way of going about things, in fact, it is a case of the "cart before the horse." The first thing to do is to get a few fowls, because it is not necessary to have land cleared to keep them; all that is wanted for a start is a brush shed, and by the time grain is got off the land a nice-sized flock will be raised and bringing in ready cash just at the time the struggling selector requires it most; and in making a start let it be on good lines, not on the haphazard go-as-you-please style. We will suppose the cash available for purchasing fowls amounts to the modest sum of £4; do not use all endeavours to buy as many fowls as possible for the money, but get a few good ones, and as egg production pays best, for preference I would select either leghorns or minorcas; but be sure that they are pure—not necessarily from prize birds; also that they are quite healthy. Fair specimens cannot, as a rule, be bought at less than 10s. a bird. We will suppose that they cost 15s. each, and that the purchase consists of a cockerel and three hens (second season birds preferred), viz., four birds at 15s. equals £3; with the other £1 buy, say, five common hens at 4s. each; these latter should be brown egg layers, for, as a rule, those hens laying brown eggs go broody, while leghorns or minorcas, which both lay white eggs, do not. All the nine birds should run together, but only the white eggs are set under the common hens as they go broody, and in 12 months time there should be a sufficient number of good pure pullets to breed from on a larger scale the following season, working up to a maximum of 200 laying hens, which will be found quite enough for the ordinary mixed farmer to attend to; but all the time stick to the one pure breed, running with them any variety that lays brown eggs, a supply of which should be kept up by hatching every year from bought eggs. The same course should also be adopted to obtain fresh blood in the breeding stock. The fact of running pure cock birds with common hens does not affect the quality of the progeny of the pure stock. And to make sure of the purity of the flock being kept up never set any of the brown or crossbred eggs, and to avoid close in-breeding always sell off cockerels that are full brothers to pullets.

In clearing the land be careful not to fall into the too frequent error of removing all the natural timber in the vicinity of the homestead, but leave an area of from one to five acres as a shade and shelter for live stock such as poultry, also leaving a good supply of undergrowth. In course of time this area could be enclosed with wire netting, and used entirely for the fowls.

PEKIN AND INDIAN RUNNER DUCKS.

All settlers who have swamp lands should go in for ducks, as they can be raised under such conditions at a very small expense by picking up a great part of their living in the water, but do not run fowls and ducks in the same yard if both have to drink out of the same water vessels, besides, ducks require to be fed in a different manner to fowls; and for choice of breed in making a start, the same thing holds good as regards quality, viz., to commence in a small way with pure-breds, either Indian runners or Pekins—the former for preference if egg production is the first consideration.

A duck egg-laying competition is now running in New South Wales, in which there are 19 competitors, the great majority of them being Indian runners; and it is interesting to note that this State is represented there, and in a highly satisfactory manner too, by a pen from the yard of Mr. A. Snell, of Bunbury, his birds are now third on the list, and from the 1st July to 31st January, quoting from the "Australian Hen," the six birds laid 794 eggs, and during the month of December made the highest record of any laying competion, viz., 175 eggs, made up as follows:—5, 5, 6, 6, 6, 6, 6, 5, 5, 5, 6, 6, 6, 5, 6, 6, 6, 6, 5, 6, 5, 5, 5, 6, 6, 5, 6, 6, 6, 6, 6, which is a wonderful score. The Sydney value of the eggs from the six birds for seven months is £2 15s. 11¾d. A flock of such ducks as these would form a very valuable asset to any farmer, especially when one remembers that eggs are worth a much higher price here than in Sydney.

There are only two pens of Pekins in the competition and their records for the seven months are 581 and 494 respectively, which show that, although good layers, they are considerably behind the Runners, but as birds for the table the Pekins are far superior, and if well fattened and sold at Christmas time would fetch 10s. a pair; whereas the Runner, owing to its small weight, would probably only fetch about half that price.

AUSTRALASIAN POPULATION STATISTICS.

The Registrar General's department has issued some important statistics, which show the manner in which the population of the States of the Commonwealth and New Zealand progressed during the years 1903 and 1904. During 1904 the actual increase for Australia and New Zealand combined was 82,414 souls, or at the rate of 1·73 per cent. This was made up of 75,184 from excess of births over deaths, or 1·58 per cent., and the remaining 0·15 per cent. is found in the excess of arrivals over departures, 7,230. Of the actual increase for Australasia, 82,414, New Zealand is responsible for 25,028, leaving Australia with 57,386. To the 75,184 increase of births over deaths New Zealand contributed 14,673, leaving 60,511 as the Commonwealth contribution. But whereas the New Zealand arrivals exceeded her departures by 10,355, the Commonwealth total arrivals were 3,125 less than the departures, and this deducted from the New Zealand excess places the excess of arrivals for Australasia at the figures already given, 7,230.

The figures disclose the fact that New South Wales and Western Australia are the only States enjoying an increase of population by immigration, this State benefiting to the extent of 10,976 during 1904 and New South Wales 6,627. In all other States there is a deficiency in the arrivals as compared with the departures, the excesses being as follow:—Victoria, 13,920; Queensland, 2,707; South Australia, 1,496; and Tasmania, 2,605. Every State is responsible for an increase more or less small, New South Wales heading the list with 29,904 and Western Australia being second with 15,335.

Turning to the different countries represented, it will be seen that the two States in the Commonwealth having the largest numerical and centesimal net increases are those which alone show an excess of arrivals over departures, New South Wales and Western Australia. With New Zealand they share the distinction of being the only countries in Australasia favoured in this respect. In the analysis of increases of the seven countries, Western

Australia stands highest in the rates of excess of births over deaths and arrivals over departures. In the net centesimal increase she is also first. Appended are the details:—

	Estimated Population 31st December, 1903.			Estimated Population 31st December, 1904.			Net Increase during 1904.		Analysis of Increase. By excess of—				Total Net Increase.
	Males.	Females.	Total.	Males.	Females.	Total.	Numerical.	Per cent.	Births over Deaths.		Arrivals over Departures.		
									No.	%	No.	%	
New South Wales ...	754,632	676,997	1,431,629	773,234	688,299	1,461,533	29,904	2·09	23,277	1·63	6,627	0·46	29,904
Victoria	605,361	603,493	1,208,854	605,035	605,269	1,210,304	1,450	0·12	15,370	1·27	13,920*	1·15*	1,564
Queensland	285,297	230,233	515,530	287,799	233,856	521,655	6,125	1·19	8,832	1·71	2,707*	0·52*	6,125
South Australia ...	187,153	181,670	368,823	191,358	181,324	372,682	3,859	1·05	5,355	1·45	1,496*	0·40*	3,859
Western Australia ...	135,961	90,993	226,954	144,256	98,033	242,289	15,335	6·76	4,359	1·92	10,976	4·84	15,335
Tasmania	93,078	86,409	179,487	93,158	87,042	180,200	713	0·40	3,318	1·85	2,605*	1·45*	713
Commonwealth...	2,061,482	1,869,795	3,931,277	2,094,840	1,893,823	3,988,663	57,386	1·46	60,511	1·54	3,125*	0·08*	57,386
New Zealand ...	439,674	392,831	832,505	453,989	403,544	857,533	25,028	3·01	14,673	1·77	10,355	1·24	25,028
Australasia ...	2,501,156	2,262,626	4,763,782	2,548,829	2,297,367	4,846,196	82,414	1·73	75,184	1·58	7,230	0·15	82,414

* Denotes excess of departures over arrivals.

The following table gives the population of Australasia at the end of each of the years 1893 to 1904:—

	Western Australia.	Commonwealth of Australia.	New Zealand.	Australasia.
1893	65,037	3,383,447	672,265	4,055,712
1894	82,014	3,450,368	686,128	4,136,496
1895	101,143	3,517,239	698,706	4,215,945
1896	137,796	3,581,291	714,162	4,295,453
1897	161,694	3,648,264	729,056	4,377,320
1898	167,810	3,696,956	743,463	4,440,419
1899	170,651	3,749,042	756,505	4,505,547
1900	179,708	3,774,481	768,278	4,542,759
1901	194,109	3,830,021	787,657	4,617,678
1902	213,327	3,886,823	807,929	4,694,752
1903	226,954	3,931,277	832,505	4,763,782
1904	242,289	3,988,663	857,533	4,846,196

It will be seen that during the 11 years ended December 31, 1904, the population of Australasia increased by 790,484, made up of an increase of 605,216 in the population of the Commonwealth and 185,268 in that of New Zealand, while, during the same period, the population of Western Australia increased by 177,252.

The manner in which these increases were made up during the 11 years is as follows:—

	Western Australia.	Common-wealth of Australia.	New Zealand.	Australasia.
Excess of births over deaths ...	27,145	617,743	135,938	753,681
Excess of arrivals over departures	150,107	*12,527	49,330	36,803
Total Increase	177,252	605,216	185,268	790,484

* Excess of departures over arrivals.

THE LONDON MARKETS.

The following were the ruling prices in London, on March 7, for copper and tin:—

Copper.—Copper on spot is quoted at £68 1s. 3d., and forward at £68 8s. 9d., per ton.

Tin.—Tin on spot is quoted at £133 15s., and forward at £132 10s. per ton.

Lands available for Selection in the Katanning District.

During December last year, Mr. R. Cobham, Government land agent at Katanning, made a tour of inspection of Crown lands east of Wagin, Katanning, and Broome Hill, and came across about 46,000 acres of first-class agricultural lands suitable for cattle, sheep, dairying, and agriculture. An abundance of good fresh permanent water supplies were found, and, moreover, he has especially noted that he saw no signs of rabbits. An examination of the sand plains at the back of these lands proved the non-existence of poison, on account of which they should in the near future be utilised as a depasture for sheep, moreover there are many shrubs on these plains which are excellent sheep feed. The report for several reasons is an interesting one, and reads as follows:—

"I beg to hand you herewith report of my inspection of Crown Lands east of Wagin, Katanning, and Broome Hill. Leaving Katanning on 9th inst., Dyliabing was the first place stopped at, being Messrs. Warren Bros. selections, containing an area of about 10,000 acres of rich land capable of carrying a sheep to the acre when the timber thereon has been killed. It is 6½ years since the Warren Bros. selected here; they are the pioneers of their district, and, as an example of what has been done by many of the settlers in these parts, I quote herewith some of the principal work done by them—Fencing: 8 miles of rabbit-proof, 7 miles of dog-proof, and 19 miles of sub-divisional fencing, besides 8 miles of fencing now in course of construction; and nine dams have been constructed, one well 56 feet deep, one bore 112 feet, and another 46 feet; both bores, however, proved a failure. Two hundred and fifty acres have been cleared, and 4,000 acres ringbarked. Three orchards have been planted on the property, chiefly with peach, apple, pear, plum, and vines. The stock consists of 2,800 merino sheep, 40 horses, and 30 head of cattle. Their wool this year realised 11d. per lb. in London.

"The total approximate area of first-class lands met with amounts to 46,300 acres."

After making certain recommendations as to suitable sites for the erection of Trigonometrical Stations, Mr. Cobham goes on to say:—

"*Soaks.*—A permanent soak exists in flat granite rock at Quarliming, around which there is about 400 acres of first-class land. This is a peculiar soak, underlying the rock at an angle of about 45 degrees . . . . . A well-marked watercourse was met with at a point evidently an arm of the Coblinine River. At this point there are two large pools containing an abundant supply of good, fresh, soft water. . . . . In the vicinity of these pools a splendid area of first-class country exists, comprising an area of fully 15,000 acres magnificently grassed. This belt of country is adapted for cattle, sheep, dairying, or agriculture, the soil consisting of rich chocolate and red loams and timbered with York Gum, Morrell, Jams, and Salmon Gums. The Eastern boundary of this rich belt is the rabbit-proof fence. . . . . The sand plains are free from poison, and I feel sure on that account will be utilised in the future as a depasture for sheep, there being many shrubs thereon which are excellent sheep feed. I was greatly struck by the abundance of natural grasses met with during the trip, averaging in height from 18 inches to 30 inches, green grass being still in strong evidence.

"During the whole of my trip I saw no signs of rabbits.

"Whilst on this trip I saw several experimental plots of artificial grasses, Messrs. Warren Bros., and Hamilton Bros., having sown patches *Paspalum Dilatatum*, and although only a small area has been sown in each case, the results point out that this grass would readily adapt itself to the conditions here, and prove invaluable for stock. This grass has been largely and successfully grown in the other states, and has been proved to be drought proof, and stock of all descriptions greatly relish it. Messrs. Warren Bros. have also successfully experimented with Dwarf Hessex Rape.

"With reference to the different soaks seen by me, both on alienated and unalienated lands my attention was especially drawn to the excellent results obtained by ringbarking the country surrounding Granite outcrops, causing soaks to be visible at the surface, the existence of which were previously unknown. . . . . I am informed of the existence of a large area of good salt-bush country distant about 90 miles east of Katanning, and in the vicinity of a large lake, which was formerly used as a sheep run by a Mr. Graham, which I purpose inspecting early in January, for, owing to recent inquiries for this class of country, I feel sure that if the country is as good as reported, it will be readily taken up and stocked with sheep. . . . . . ."

Mr. Cobham, in accordance with his expressed intention of making a further inspection, has forwarded to the Chief Land Agent at Perth, under date February 14, the following report showing the inspection of Crown Lands to the east and south of Katanning and Broome Hill:—

"Since my appointment here I have had several inquiries from squatters in the Eastern States, whether areas of good sheep country were obtainable in this district. Promising information obtained from old settlers and sandalwood hunters induced me to inspect the country in the vicinity of Lake Chinocup. With this object in view, I left here on the 15th ult., accompanied by Wm. Farmer (guide) and native, Penny, returning on the 26th ult., during which period I travelled a distance of 370 miles. I discovered and inspected an area of 25,900 acres of what I consider first-class agricultural land within 30 miles of Katanning, and about 50,000 acres of first-class salt-bush country well adapted for sheep, situated on the north, east, and south sides of Lake Chinocup. An abundant supply of good fresh water is obtainable at the foot of the sandhills at the southern end of this lake, at a depth ranging from 15 inches from the surface. At the northern and eastern sides of the lake I came upon 11 other lakes, and on the southern end 14 lakes, all salt, most of which were dry. Salt of a first-class quality exists in abundance in several of these lakes, a sample of which I brought to Katanning. I also brought a sample of salt bush. In the vicinity of the salt-bush country I saw large numbers of emus, a sure indication of fresh water. *En route* to the lake, I travelled *via* Yellanup, Nyabing, Nampup Spring, Nowerlup Tank, and Kuringup Spring, an abundant supply of fresh water being obtainable at each place. At Kuringup Spring I found the soak filled up, so opened up another, which I timbered. Surrounding the above-mentioned spring are from 3,000 to 5,000 acres of splendidly-grassed country, timbered with jam, York, and salmon gum, morrell, and manna gum. Already, since my return to Katanning, 3,140 acres of the country inspected have been applied for under clauses 55 and 74. The sample of the salt-bush now in the office has been inspected and admired by local settlers and by many from the other States, with the result that three parties have decided to inspect the salt-bush country in the vicinity of Lake Chinocup, with the idea of applying for large areas. On the 24th ult. I reached Majitup Estate, originally applied for by Messrs. Ball Bros., and recently purchased by Mr. A. R. Richardson for £5,000. This estate comprises an area of 10,000 acres, of which 7,000 acres are held under C.P. The stock on this estate consists of 2,200 Merino and Shropshire sheep, 13 horses, and 27 head of cattle. Improvements consist of 20¼ miles of dog-proof fencing, four miles of 6-wire fencing, woolshed, and necessary drafting yards; also sheep-dip; 5,000 acres ringbarked, excavated tanks, one of 1,500 cubic yards, one of 1,000 cubic yards, and one in course of construction to contain 1,500 cubic yards; 70 acres of wheat recently harvested returned an average of 19 bushels, and, but for a recent thunderstorm, this crop would have averaged 25 bushels. A large area of country has been taken up from 20 to 30 miles east of Broome Hill. A spur railway line in the vicinity of Gnowangerup would induce many suitable farmers to take up large areas in that locality, and to the eastward. A spur line as suggested in my annual report for 1904 would, I feel sure, amply justify its construction . . . . Surrounding the Nowgrelup Tank and Soak, there are about 3,500 acres of good country, well grassed, the holding capacity of this tank being about 134,000 gallons, and contains an abundant supply of excellent water. . . . Kurningup Spring was my depôt while inspecting the country surrounding Lake Chinocup, being distant about six miles north-westerly. This spring is bound to be much availed of for travelling stock in the near future. . . . During this trip of inspection I saw a great many beehives in trees in the vicinity of all Soaks. . . ."

WEST AUSTRALIAN GOLD AND OTHER MINERALS YIELD.

The official returns issued by the Mines Department on 1st March show that the gold output of Western Australia for February of this year, as disclosed in the quantities exported from the State and received at the Perth Mint, amounted to 154,032·86 fine ounces. The quantities were as follow:—

	fine ozs.
Exported...	57,212·61
Received at Mint	96,820·25
Total	154,032·86

The value, calculated at £4 4s. 11·45d. per ounce is £654,290. The yield is lower by 11,419 ounces than that for the previous month, and 8,369 fine ounces less than the yield for February, 1904. The total for the two months—319,485·26 fine ounces—is 19,570 fine ounces less than the yield for the corresponding two months of last year—339,055 fine ounces.

The following table gives the yearly output of gold from 1886 to date:—

Year.	Grand Total.			
	Fine Ozs.	Value.		
		£	s.	d.
1886	270·17	1,147	12	2¼
1887	4,359·37	18,517	8	6¼
1888	3,124·82	13,273	7	10
1889	13,859·52	58,871	9	11¾
1890	20,402·52	86,663	19	5¼
1891	27,116·14	115,182	0	10
1892	53,271·65	226,283	11	8½
1893	99,202·50	421,385	8	8½
1894	185,298·73	787,098	19	6
1895	207,110·20	879,748	4	2¼
1896	251,618·69	1,068,808	5	2
1897	603,846·44	2,564,976	12	9¼
1898	939,489·49	3,990,697	13	10
1899	1,470,604·66	6,246,731	10	7¾
1900	1,414,310·86	6,007,610	13	4½
1901	1,703,416·52	7,235,653	9	1
1902	1,871,037·35	7,947,661	9	7¾
1903	2,064,801·40	8,770,718	17	0¼
1904	1,983,230·07	8,424,225	17	3¾
1905*	319,485·26	1,357,087	2	5½
Total ...	13,236,356·26	56,222,343	14	2½

* To 28th February, 1905.

SOME MINERALS OTHER THAN GOLD, 1904.

			Value.
Black Tin (raised) ...	855 tons	=	£58,817
Coal (raised)	138,550 „	=	67,174
Copper Ore (raised) ...	3,969 „	=	25,180
Silver (exported) ...	399,190 fine ozs.	=	45,912

INFORMATION FOR LAND SELECTORS.

The Hon. J. M. Drew, Minister for Lands, has initiated a new departure in dealing with *bona fide* persons in search of suitable areas of land for mixed farming. Instructions have been given to Mr. H. S. Ranford, who for many years has been identified with land settlement in this State, to procure exhibits of cereals, fodder plants, fruits, and vegetables from various districts in this State for exhibition purposes at the Lands Office, Perth. In this way selectors may have occular demonstration of what the soils here are capable of producing.

The following lessees have sent along produce for the purpose stated above:—

Mr. A. Reeve, of Balbarrup, south of Bridgetown. Potatoes (Farmers' Glory).

Dr. Hackett. Potatoes from Donnybrook (British Queen).

Mr. J. B. Dearle, Kojonup.—Onions (White Queen, Spanish).

Mr. H. W. Lilley, Wagin.—Apples (Lord Nelson and Emperor Alexander).

Mr. Hammond, Jandakot.—Apples (Cleopatra, Jonathan, Lord Nelson) and sweet corn.

Mr. Owen Saggers, Tambellup.—Fodder grass (Paspalum Dilatatum) and English barley.

Mr. James Fitt, jun., Narrogin.—Wheat (Baroota Wonder and "Lots" Early).

Mr. W. L. Holly, Kojonup, Broome Hill Road.—Lucerne.

Mr. W. Larsen, Mooradup, Balgarup River (10 miles west of Kojonup).—Wheat (30 bushels per acre).

Mr. McInnes, Southern Cross.—Pie melons (grown without irrigation).

Mr. Donald McDonald, Birnam Wood, Broome Hill.—American potato oats.

Mr. E. A. Watts, Pingelly.—Potatoes (Early Rose).

Mr. G. S. Sloan, Rockingham.—Potatoes (Beauty of Hebron).

Mr. McB. Broun, Pingelly.—Onions.

Mr. Harold Brockman, Donnybrook.—Japanese plums ("Kelsey").

Mr. W. T. Jones, jun., Kojonup.—Wheat (Purple Straw).

Messrs. Norie and Watkins, Jarrahdale.—Apples (Lord Nelson) and quinces.

Messrs. Gottsch Bros., Whinbin Rock, Wolwolling.—Wheat (Steinweidel).

Mr. J. J. Treasure, Kojonup.—Wheat.

Mr. Douglas, Police Station, Bridgetown.—Potatoes (Old Red).

Mr. G. E. Werner, Wolwolling.—Wheat (Steinweidel); 200 acres of new land, averaging 14 bushels.

Mr. C. Warburton, Bridgetown.—Onions.

Mr. J. J. Mottram, Bridgetown.—Potatoes.

Mr. T. May, Bridgetown.—Potatoes (Beauty of Hebron).

Mr. L. F. Vanzuilecom, Ernyellup, Kojonup.—Kangaroo grass (indigenous).

The Lands Department would be glad to receive from settlers specimens of produce for exhibition purposes. Railage will be paid at Perth end, and all parcels should be consigned to the Under Secretary for Lands, Perth.

ANALYSES OF SOILS AND FERTILISERS.

The following return shows the amount of analytical work performed in the Government Laboratory during 1904 in connection with agriculture.

The return is very disappointing as showing the small extent to which those who should be interested take advantage of the facilities provided by the Government.

Analyses are conducted at low rates specially reduced for farmers, gardeners, etc., so as to encourage producers in availing themselves of the technical assistance available but so far they have been slow to see the value of such help.

Last year a table of unit values was drawn up for this State so as to be able to advise purchasers of manures as to the value of their purchases, thus protecting them against any exorbitant demand on the part of the vendors, but only in one instance was assistance sought in this direction—and the large amount of work spent on this was practically wasted. Only once before, I believe, has such a table of unit values been compiled (by Mr. Dougall), and consequently farmers had no guide as to whether they were paying a fair price or otherwise for their goods.

It is hoped, however, that in the coming year, with the appointment of an Inspector of Fertilisers and vigorous supervision of this trade, the value of chemical analyses will be more fully recognised.

As regards soils, much requires to be done in the way of chemical analysis, with a view to a classification of the soils of this State, and I should be glad to receive samples of the typical soils of various districts with this end in view.

ANALYSES MADE DURING 1904.

(The numbers in brackets indicate the analyses made for farmers and other producers.)

Fertilisers, 13 (3).
Soils, 32 (23).
Natural deposits (for fertilising constituents), 6 (3).
Fungicides, 2.
Barks (for Tanning): Mallet, 6; Wattle, 2; Mangrove, 1; Gumlet, 2; White Gum, 2.
Water (for irrigation), (2).

In addition to the above, 70 estimations (on 23 fertilisers purchased in the market) were made in connection with the compilation of unit valued for 1904.

There can be little doubt that with the present haphazard way of fertilising soils farmers must waste valuable seasons in ascertaining by successive trials what are the special manures required by their particular soils, when preliminary analysis would have given them the necessary indication in the first instance.

E. A. MANN,
Government Analyst and Agricultural Chemist.

APIARY NOTES.

PLANTAGENET BEEKEEPERS' ASSOCIATION.

The ordinary monthly meeting of the above association was held on 20th February at the president's residence, Albany, and it was announced that the following statistics had been received from the Department of Agriculture:—

Year.	Honey imported.	Value.			Honey produced in W.A.
	lbs.	£	s.	d.	lbs.
1901	86,916	1,446	0	0	142,082
1902	56,621½	1,186	0	0	262,968
1903	59,279	1,252	0	0	179,271
1904	212,841	3,138	0	0	not available

It will be noticed that the statistics for 1904 of honey produced in Western Australia are not available at present. No record is kept of the value of local honey, inasmuch as the prices vary according to market requirements.

A discussion took place on several questions considered to be of importance, and with a view of keeping other beekeepers posted on the subjects which seemed to be troubling the Plantagenet Association the following questions and results of the discussion thereon are given:—

(1.) What size strips of foundation comb pay best?—Most of those present were in favour of full sheets everywhere except in the pound sections. (2.) How many beekeepers use disinfectants?—It was discovered that beekeepers generally do not recognise the importance of disinfectants to prevent disease among bees. (3.) Should old combs be renewed?—It was considered that hives make more progress where combs are renewed in the brood chamber every year, but old combs are the best for extracting, being stronger than new combs. (4.) When bees maliciously tear down foundation comb, is it through any fault in the foundation comb?—This question led to a discussion on the different makers of foundation comb, but the cause was thought to be through giving the bees too much building to do at once. (5.) What sort of top bar is best for deep frames?—None were in favour of the "vedge," but all preferred the "wedge and groove" except one, who preferred a plain bar. (6.) If a queen becomes a drone layer in her second year, will she recover if given a chance?—It was considered a drone layer should be destroyed. (7.) Are large queens better than small ones?—Some very good queens are small and some large ones are inferior, so a queen should not be judged by size alone.

It would appear from the fourth question and answer that the majority of beekeepers in this State buy their foundations instead of making them. The initial outlay for purchase of the necessary machine is but small, and it may be of some interest to Western Australian beekeepers to know that their brethren in Canada in nearly every instance make their own foundations.

The monthly meetings of this association will be held as under:—

March	20	August	14
April	17	September	11
May	15	October	9
June	12	November	13
July	17	December	11

If kindred associations would keep the Editor informed of the result of their experiences, they would be assisting not only him but also other beekeepers. It should not be overlooked that exchanges of thought and experience will have an all-round beneficial result.

HONEY VINEGAR.

If you simply mix the honey and water so that an egg will fairly float at the top showing about the size of a dime out of water, it may be sufficient or it may not, according to the amount of ferment contained in the honey, and also according to the temperature after the mixture is made. To make vinegar there must be an alcoholic fermentation previous to the acetic, and the more thorough the first fermentation is, the better the acetic fermentation will be.

In order to hasten the fermentation, it is best to add some fresh fruit-juice to your honey water. Then, if the liquid is cold, or if the temperature is low, it is best to heat the liquid till it reaches about 90 or 100 degrees. If it is kept warm, the fermentation will soon begin, and if it remains exposed to the air, it will be but a short time till the sour taste begins to show.

We never allow any honey to go to waste. The washing of the cappings in a well-regulated apiary will furnish enough vinegar for two or three families, even if only a few hundred pounds of honey have been uncapped. In a large apiary, the cappings are first drained through the uncapping-can in a warm room until they seem perfectly dry, and even then several barrels of sweet liquid can be secured from the washings of the cappings of fifteen or twenty thousand pounds of honey. We figure that each thousand pounds of honey extracted gives us about 15 pounds of beeswax from the cappings, and, perhaps, five gallons of sweet water, fit to make good vinegar. So the apiarist should never render his beeswax till it has been thoroughly washed.

Vinegar which will not sour may lack two or three things which are all needed. Sufficient warmth, as stated above. If all other requirements are right, it will still be impossible for vinegar to sour if the weather is cool. A good place to keep a gallon of vinegar is right behind the kitchen stove. In a few days a jug full of mild vinegar will become very sour. Do not cork it tight, but cover the mouth with a cork. A wide-mouthed jar covered with a cloth is still better.

Air, that is, oxygen, is needed. The making of vinegar is simply the oxidising of the sugar contained in the liquid. No change may take place unless the air is, or has been, supplied. For that reason the vineyardist keeps his barrels of wine full, and bunged tightly so that no air may reach the wine. If, perchance, a barrel remains open, he soon has a barrel of vinegar, instead of a barrel of wine, and the better the wine has been, the better the vinegar will be. Sufficient sweetness is needed. If the directions I give are followed, a good article of vinegar will be produced. If you want to put the honey by weight, put not less than two pounds of honey for each gallon of water. A less quantity may make fair vinegar, but it is much easier to weaken your vinegar, if too strong, by the addition of a little water when you wish to use it than to strengthen it by adding more honey after it is partly made.

A very good inducement for any sweet or alcoholic liquid to turn to vinegar is the addition to the liquid of what is called "vinegar-mother," the viscous, ropy matter which is usually found in a barrel of good vinegar. This "vinegar-mother" contains the principal ingredients that go to make vinegar, and although it is practically degenerated vinegar, yet it will add strength to the vinegar very promptly.

So if you happen to have some old vinegar that has been long standing, you soon strengthen your new vinegar by adding a little of this "mother." Do not listen to those who say that this is a disgusting-looking residue. It looks no worse than an oyster does. Vinegar containing this residue is sure to be pure and wholesome. Vinegar made from chemicals does not contain any "mother," neither does it contain any living organism.

The more air the vinegar gets at the proper temperatures the quicker the vinegar is made.

Manufacturers of first-class wine vinegar in Europe often drain their vinegar through a barrel full of shavings slowly, drop by drop, so as to give it a good chance to air. In this way the best vinegar is made.

If you have no fruit juices to add to your vinegar, a little cider will help to give it a start.—*American Bee Journal.*

GARDEN NOTES FOR APRIL.

By PERCY G. WICKEN.

This month generally sees the breaking up of the long, dry period of the summer months, and good falls of rain may be expected. The ground being warm and the early rains being generally warm, all vegetation which has barely been keeping alive for the past few months quickly responds to the altered conditions, and, after being refreshed by these welcome rains, takes on a fresh, green appearance and makes rapid growth. Our experience teaches us that it is always the early sown plants that do best; and to have early vegetables of all winter kinds, the ground should be thoroughly prepared before the rain sets in, so that, directly the ground becomes moist, the seeds can be planted, and while the ground is warm they will make rapid growth; if left until the ground becomes saturated with moisture and comparatively cold the growth will be much slower. The ground should be deeply worked by sub-soiling or trenching so as to allow the air and water to penetrate the soil, and due provision made for running off the excess water later on in the winter without having to disturb the growing plants when the ground becomes soft and perhaps boggy. Young plants, such as cabbages, cauliflowers, and even root crops, should be raised in boxes or sheltered beds so that they can be planted out on the first occasion. In planting out young seedlings, only strong healthy plants should be used, all weak and unhealthy looking plants should be discarded; it will be better to wait until a fresh supply can be raised than to put out weakly plants. It is frequently the case that plants are weak and misformed through being too thickly sown in the seed beds, each seedling not having sufficient room in which to develop, and to prevent this the young plants should be thinned out so that one plant does not interfere with another. It will be better to raise a smaller number of healthy strong plants than a large quantity of weak ones. With the advent of the first rains a bountiful crop of weeds will no doubt appear, and these should be cut down as soon as possible, the sooner they are hoed down the easier will be the work, as the roots very soon obtain a good hold of the ground. A Planet Junior machine, either of the horse or hand type, is the best for this work, and will enable one to cut out the weeds with a minimum amount of backache.

ASPARAGUS.—Should be much more extensively cultivated than it is. It is planted very early in the spring. A good bed, trenched to a depth of 30 inches and thoroughly well mixed with well-rotted stable manure, should be prepared during the winter months so as to give the manure a chance to mix with the soil before the spring.

BEANS (Broad).—Sow extensively of these as soon as possible. They prefer a fairly heavy soil, but do on a wide range of soils. Sow in rows about 3ft. to 4ft. apart and the seeds about 4in. apart in the rows.

BEET (Red and Silver).—Put out seeds in seed beds ready to plant out on the first opportunity, or the seed may be sown direct in the rows and thinned out as they come up.

BORECOLE OR KALE.—Thousand Headed, Jersey Tree, or Curly, is well worth trying; it is a hardy plant and supplies a large amount of green leaves, valuable for poultry and stock, and the Curly Kale especially is valuable as a vegetable. Plant and treat the same as cabbage.

BRUSSEL SPROUTS belong to the same tribe as the cabbage, and are well worth attention as a vegetable. It requires a rather cool climate and should succeed in the Southern districts; the plants are better raised in seed beds, and treated the same as cabbages.

CABBAGES AND CAULIFLOWERS.—Have a good supply of young plants available in the seed beds to put out on the first opportunity, and sow a supply for future use. Manure the soil well with stable manure when available, and plant out in rows 3ft. apart and 2ft. apart in the rows; as the plants make a good growth a little liquid sulphate of ammonia will help them along. Only plant out healthy plants and put the roots down straight.

CARROTS.—Sow extensively in drills. Drills should be 3ft. apart; but two rows of carrots may be sown in each drill. Sow the seed thinly and thin out when plants are large enough.

CELERY.—Sow some seed in seed bed and plant out any plants that are large enough. Thoroughly manure the ground before sowing, and hill up any plants that are well-grown.

LEEKS.—Sow a quantity of seed and plant out any seedlings that are ready.

LETTUCE.—Sow a quantity of seed and plant out all the seedlings available.

ONIONS.—Sow a liberal supply of seed, either in seed beds or direct into beds, and thin out as soon as they come up. They require a well-worked, pliable, loamy soil, well manured with stable manure. The drills in the permanent beds should be about 16 inches apart, and the plants four inches apart in the drills.

PARSNIPS.—Sow a few rows, the same as carrots, in deeply worked and well-manured soil.

PEAS.—Sow largely in rows 3ft. to 4ft. apart; when a few inches in height they will require staking. Light brushwood sticks are the best to use for this purpose.

TURNIPS.—Early sown turnips will require thinning. A few more white turnips and a crop of Swedes can be sown during this month. Keep the beds free from weeds.

FARM.—Wherever the ground is in good enough condition ploughing should be pushed on with as fast as possible, and with modern makes of disc ploughs ploughing can be carried out at all times of the year. Land that was fallowed early in the season will require to be harrowed or scarified before sowing. As much of this work as possible should be done before the rain sets in, as, owing to the short season, the land speedily becomes soft, and in many cases last season farmers were unable to complete their seeding operations. Directly sufficient rain has fallen the cereal crops should be sown as quickly as possible, and if all the ploughing, harrowing, etc., is left until this time settlers with only limited horse-power at their disposal find it impossible to get the sowing done in time. All wheat, oats and barley should be pickled in a solution of bluestone and water, 1lb. of bluestone to five gallons of water, before sowing, as a preventative against smut. Smut is becoming very prevalent among the wheat crops, and this is mainly due to the seed-wheat being sown unpickled, or to the pickling being done in a very indifferent manner. Special attention should be given to the selection of wheat for seed purposes; it will always pay to get the best obtainable, and the extra price paid for first-class seed is money well spent. Inferior and pinched seed is dear at any price. Like produces like, good seed good crop, bad seed bad crop, other conditions being equal the good seed pays for itself several times over.

THE WORLD'S WHEAT MARKETS.

The local wheat market remains steady. Supplies offering in Perth are not large. Holders for the most part are seemingly not anxious to quit, save at their own figures. The quotation for f.a.q. grain is 3s. 4½d. to 3s. 5d., while for prime milling wheat a further ½d. to 1d. per bushel would very likely be realised.

In South Australia the demand is not very spirited, and buyers are exhibiting great caution in their operations. On the spot markets rule steady, with a fair demand, and quotations range from 3s. 4½d. to 3s. 5d. per bushel Port Adelaide. Victorian markets rule quiet, but steady, and considerable sales have been made on the basis of 3s. 4¼d. to 3s. 4½d. Sydney market is steady, with a moderate business doing, and quotations there may be given as 3s. 4½d. per bushel on trucks Darling Island.

The American wheat market has remained above the parity of European prices for some months past, in consequence of the falling-off in the crop and the inferior quality of much of the wheat harvested last year, the supply of really good wheat being insufficient to leave a surplus for export. The position is to some extent an artificial one, and as the season advances it is natural that the market should become subject to rapid fluctuations, especially when speculators are at work. The news of a heavy slump in Chicago and New York, occasioned by reports that the Gates pool are unloading their wheat on the Produce Exchange, is not very surprising. The European markets, however, appear to be little affected by the decline in America.

The European position is referred to by "Dornbusch" in the following terms:—Whatever experience may be in store for the trade in the coming months when stocks shall have been reduced by the attrition of consumption, which probably will not be balanced by imports, it cannot be gainsaid that present conditions are extremely quiet, and value seems more inclined to recede than otherwise. Shipments from Russia have been maintained in unexpectedly large volume, and this, perhaps more than any other single influence, has prevented the trade from taking more interest in Australian and La Plata cargoes. The large shipments from Argentina and India were regarded almost as a matter of course; it was the persistence of Black Sea and Azoff shippers in meeting the demands of Western Europe that checked enthusiastic visions of higher prices, and compelled the belief in larger available supplies, whose possibility it was the vogue to ignore in certain trade circles. To illustrate the important part played by Russia as a contributor, the total output from wheat from the Czar's dominions since 1st August, amounts to 12,207,000 quarters, compared with

9,194,000 quarters in corresponding period last season. Practically 3,000,000 quarters in excess of general expectation, and nearly half of this surplus was for U.K. account. The cargo market has dragged throughout the week, and except that Rosario Santa Fe is a shade lower, there is no definite alteration. Australian on passage offers vainly at 32s. 9d. to 33s., and the same rates are quoted for new crop. No. 2 Calcutta has been in fair request for London, and considerable purchases were made early in the week of Red Karachi and White Delhi for Bristol Channel. Liverpool bought La Plata parcels for shipment. The firmness of Russian shippers stops business in fine samples from Black Sea ports.

The quantity of wheat afloat for the United Kingdom is 4,150,000 quarters, and for the Continent 1,310,000 quarters. Atlantic shipments for the week amounted to 43,000 quarters.

LONDON WOOL SALES.

JANUARY SERIES.

The first series of colonial wool sales for the current year, which opened on 17th January, closed on 1st February. There seems a certain amount of discrepancy between the various brokers as to the quantity of wool which was actually available, and which was originally given as 146,500 bales. Of these it now appears that about 3,000 bales, chiefly Cape, must have been disposed of privately, for the return at the end of the series showed the following quantities as catalogued, whilst only 660 bales are said to have been held over unoffered. The following figures give the number of bales at this series and the corresponding series last year:—

	1905. Bales.	1904. Bales.
Sydney...	33,629	23,288
Queensland	21,283	11,749
Port Phillip	26,277	24,495
Adelaide	9,497	12,237
Tasmania	1,114	220
Western Australia	13,824	14,764
New Zealand	30,165	39,740
Cape	7,245	7,970
Total catalogued	143,034	134,463

Out of this total about 138,000 bales were sold; 73,000 bales for home consumption, 61,000 to the Continent, and 4,000 to America, leaving about 5,000 to be carried forward to next series.

The sales opened with a very numerous attendance of buyers and spirited competition, merinos ruling from previous rates to 5 per cent. advance, whilst crossbreds, on the average, were about 5 per cent. dearer than the closing rates of the previous series. For the first few days prices remained very firm with, if anything, a tendency in sellers' favour, but at the commencement of the second week the news of strikes and riots in Russia, which assumed almost a revolutionary character, and of strikes of the coal workers in parts of Germany and Belgium, caused some hesitation owing to the fear of possible further complications, and prices turned in buyers' favour, but only to a slight extent so far as merinos were concerned whilst, on the other hand, the fall in medium and coarse crossbreds was rather sharp, amounting in many cases to 1d. to 1½d. per lb. on the top prices of the previous week; and although there was more firmness at the close owing to the Russian situation not appearing so serious as was first feared, there was not any marked recovery in values. As regards the coarser crossbreds, the drop is not altogether surprising, for their values had advanced beyond all reason, and a decline was merely a matter of time, although the present fall has been rather more sharp and sudden than was looked for.

As compared with the closing rates of the November series, quotes were: Scoured merino wools, par; good greasy merinos, par to 5 per cent. lower; inferior, faulty, and wasty, greasy merinos, 5 per cent. lower; fine crossbred wools, par; medium and coarse crossbreds, 7½ to 10 per cent. lower; lambs, in general, par to 5 per cent. higher.—*Morning Herald*.

WINDELER & CO.'S WOOL REPORT.

London, February 1st, 1905.

Merino lambs are most faulty this season, but are generally par to 5 per cent. dearer than at the last auctions in November; crossbred lambs have been very sparingly represented.

The present Australian merino clip, though better in quality than last, still leaves much to be desired in this respect, and is, besides, very defective; free wools of fine quality have consequently commanded specially strong competition and full rates.

Cape wools, when in good condition and of good staple, have been in much request to supply the deficiency of free Australians, and some excellent prices have been obtained, but the bulk, consisting largely of wasty and irregular growths, must be quoted about 5 per cent. lower. Scoureds, as for so long past, have been scarce and well competed for at full rates.

VALUE OF AUSTRALASIAN AND CAPE WOOL IN LONDON, JANUARY, 1905.

SYDNEY.

Scoured.	d.		d.
Superior ...	21	to	23
Av. to good ...	18½	,,	20½
Inferior ...	15	,,	16
Greasy.			
Superior ...	13	,,	14½
Av. to good ...	10½	,,	12½
Inferior ...	8	,,	9
Crossbred ...	9½	,,	12

QUEENSLAND.

Scoured.			
Average ...	18	,,	19
Greasy.			
Superior ...	11½	,,	12½
Av. to good ...	8½	,,	10½

SWAN RIVER.

Washed.			
Average ...	13½	,,	14½
Greasy.			
Average blue ...	10½	,,	11½
,, red ...	7	,,	7¾

PORT PHILLIP.

Scoured.	d.		d.
Superior ..	22	to	24
Av. to good ...	19	,,	21½
Inferior ...	15½	,,	16½
Crossbred fine...	18	,,	20
,, low...	12	,,	13½
Greasy.			
Extra	15½	,,	16½
Superior ...	14	,,	15
Good	12	,,	13
Inferior to av.	9	,,	11
Crossbred super.	13½	,,	14½
,, fine	12	,,	13
,, Lincoln	10½	,,	11
Scoured.			
Pieces, av. ...	16½	,,	18
Greasy.			
Pieces, av. ...	8½	,,	9½
Scoured.			
Lambs, av. ...	15	,,	16
Greasy.			
Lambs, av. ...	8	,,	9

ADELAIDE.

Scoured.	d.		d.
Av. to good ...	18	to	19
Greasy.			
Superior ...	10½	,,	11½
Av. to good ...	8½	,,	10
Inferior ...	6½	,,	7½

NEW ZEALAND.

Scoured.			
Good	20	,,	20½
Average ...	17	,,	18
Greasy.			
Superior ...	11½	,,	12½
Av. to good ...	10	,,	11
Inferior ...	8	,,	9
Crossbred fine	12	,,	14
,, av.	10½	,,	11
,, low	9½	,,	10½
,, lambs	7¾	,,	9½
Slipe.			
Half-bred ...	14	,,	15
Lincoln ...	12	,,	12½

CAPE.

Scoured.	d.		d.
Western super. S.W. ...	20	to	21½
,, good	17½	,,	18½
Eastern average	16½	,,	17½
,, inferior	15	,,	15½

Washed.	d.		d.
Western long	11½	to	12½
Kaffrarian average	9	,,	9½

Greasy.	d.		d.
Western Cmbg. super. ...	9½	to	10½
Eastern ,, ...	7¼	,,	8
,, short average ...	7	,,	7¼
Kaffrarian	7½	,,	8

AUSTRALASIAN, ETC., SHEEPSKINS.

At auctions here on 12th January there were offered:

2,900 bales Australasian,
500 ,, Punta Arenas, etc.,
130 ,, Buenos Ayres,

and practically all sold. As compared with previous sales' rates (December 1st, 1904) we quote:

Merino combing ... ... ¼d. per lb. dearer.
Crossbred fine combing ... ... ¼d. ,, ,,
,, coarse ,, ... ½d. ,, ,,

The advance on coarse crossbreds being most marked on New Zealand skins.

There was an average attendance of buyers and good competition. Crossbreds were again bought freely for the United States.

The next auctions will be held on 23rd March.

COLONIAL WOOL SALES.

The following telegrams relating to the colonial wool sales held in London on 7th March will show the prices which may be expected to be obtained by Australasian pastoralists, and are taken from the *West Australian* of 10th March :--

London, March 7.

The March series of colonial wool sales opened to-day. The market was dull. Prices, compared with the closing rates of last series, ranged from par to 5 per cent. decline.

London, March 8.

At yesterday's colonial wool sales, Messrs. Buxton, Ronald, & Co., Charles Balme & Co., and Jacomb & Sons sold 11,953 bales. The selection was fairly representative.

There was a full attendance from all quarters, the sales arousing great interest. Competition was irregular. Compared with January closing rates merinos were practically unchanged. Faulties were occasionally 5 per cent. lower. Fine crossbreds were about a half-penny cheaper, and medium, 5 per cent., and coarse from 5 per cent. to 7½ per cent. lower. The available supply ended at 179,500 bales.

The May and July series of colonial wool sales are to be limited to 150,000 bales. No limit is to be set on the September and November sales.

LOCAL MARKETS' REPORTS.

DALGETY'S REPORT.

Messrs. Dalgety and Company, Limited, report as follows in connection with their daily sales of produce, held at Perth and Fremantle, for the week ended 8th March, 1905 :--

Wheat.--Australian wheat is steady in London at 32s. 9d. to 33s. per quarter of 480lbs. c.i.f. Melbourne and Adelaide markets are steady at 3s. 4d. to 3s. 4½d. per bushel.

Local Wheat.--There is still a good demand in the country for local wheat, prices ranging from 3s. 2d. to 3s. 5d. per bushel, according to station. Perth and Fremantle markets, which offer a demand for fowl feed only, are over supplied, and prime milling wheat is selling at from 3s. 4d. to 3s. 5d. per bushel, whilst other grades range from 3s. to 3s. 2d., and 3s. 3d. We would not recommend consignments to these centres.

Chaff.--A pleasing feature after the recent heavy glut is the light yardings at Perth and Fremantle every morning during the past week. This has done much to improve the markets, and competition for all prime lines is much keener, whilst other grades also meet with a better demand. Up till recently consignments have come forward at a rate far in excess of requirements at Perth and Fremantle, which naturally resulted in a depression in prices. At the end of February, stocks at Perth and Fremantle amounted to 2,300 tons, and it will be a matter of some weeks before this abnormal quantity is reduced. Ruling rates are as follows:

Prime green wheaten chaff, from £3 12s. 6d., £3 15s., and, possibly, £3 17s. 6d. per ton, good demand; f.a.q. wheaten, from £3 7s. 6d. to £3 12s. 6d. per ton, good demand; medium samples, from £2 17s. 6d. to £3 2s. 6d. per ton, and £3 5s., according to sample, dull of sale; inferior wheaten, dull of sale from £2 per ton upwards.

Oaten Chaff.—We sold prime oaten chaff at from £3 15s. to £4 per ton at Perth and Fremantle, Perth being the better market of the two for this class of chaff at the present time. Other grades of oaten chaff are not so firm, ranging from £3 2s. 6d. to £3 7s. 6d. per ton, according to sample. We would not recommend consignments of medium oaten chaff, as there is practically no market for such stuff just now.

All storage accommodation at Perth and Fremantle is now filled. At the present time, as is to be expected, there is no green feed on the goldfields, and our Kalgoorlie branch informs us that the season this year so far is late. Although the consumption of chaff on the goldfields is not now so great as formerly, the question of green feed in these districts must necessarily have some influence on chaff values.

Algerian Oats.—Melbourne market is easy at from 1s. 8d. to 1s. 8½d. and 1s. 9d. per bushel. Consignments on spot at Fremantle are fairly heavy, sales being effected at from 2s. 6d. to 2s. 7½d. per bushel f.o.e., Fremantle, whole and crushed.

Local Algerians.—We have no sales to report. There is still a good demand for seed.

Straw.—Straw is short on spot at Perth and Fremantle. We have to report the sale of several trucks privately during the week at £2 2s. 6d. and £2 3s. 6d. per ton, at Perth.

Hay.—We cannot recommend consignments of hay. Accumulated stocks on spot at Fremantle are heavy, and will not be relieved before the opening of the North-West season. This is a matter of some weeks now.

KALGOORLIE.

Chaff report.—Since our last report the yardings have been light, most of the chaff coming forward being of medium and inferior qualities. Present prices we consider are:—Prime green wheaten, £4 15s. to £4 17s. 6d. per ton; good quality wheaten, £4 5s. to £4 7s. 6d. per ton; but for inferior and damaged chaff there is practically no demand, although the demand for really prime quality is still maintained.

STOCK REPORT.

We report having held a successful clearing sale on account of Mr. A. G. Morrison, of Dundurn, Pingelly, on 25th ult. There was a very small attendance of buyers, but a clearance of all the stock was effected at satisfactory prices. We sold crossbred ewes at 19s.; lambs at 14s. 6d.; medium draught horses, to £35; dry cows, from £6 to £9; pigs, £5; farming implements, etc., at satisfactory prices.

We also report having held a highly successful clearing sale on account of Mr. J. Reid, Cut Hill, York. There was a large attendance of buyers from the surrounding districts, and all lots met with keen competition, and were sold at prices which were very satisfactory. Sheep, crossbred hoggets, at 18s. 3d.; cows, at £7 5s. to £8 10s.; horses, at £12 15s.; pigs, at £4 10s.

MINGENEW.

We have to report having held a very successful sale of store sheep at Mingenew on 24th ult. There was a large and representative attendance of buyers, and 5,000 sheep were sold; 600 four-tooth wethers at 14s.; 4,400 four and six-tooth wethers at 12s.

HIDES AND SKINS REPORT.

We report having held our usual weekly sale on Friday, 3rd March.

Sheepskins.—A representative catalogue was brought forward at to-day's sale. Good competition was experienced, late values for all merino and fine crossbreds being firmly maintained, but medium and coarse crossbreds were again easier, and a fall of ¼d. per lb. for these descriptions must be reported. Medium merino, half to three-quarter wool, 6d. to 6¼d.; good merino, quarter to half wool, 6¼d. to 6½d.; medium, quarter to half wool, 5½d. to 6d.; fine crossbred, quarter to half wool, 5½d. to 6⅛d.; coarse crossbred, quarter to half wool, 5d. to 5¼d.; pelts, merino and crossbreds, 5d. to 5½d.; pelts, shearlings, 4½d. to 4¾d.; lamb pelts, 5½d. to 6d. In all cases where pelts of above are sun-dried, weevil-eaten, torn, or perished, prices are from 1d. to 2d. below quotations.

Hides.—This market, in sympathy with reports from the Eastern States, was slightly easier, and with the exception of lines in extra dry condition 4¾d. was the ruling price. Heavies, special, to 5d.; heavies, 4¾d. to 4⅞d.; medium and light, 4¾d. to 4⅞d.; medium and light, dirty condition, 4¼d. to 4⅜d.; dry, 4½d. to 5¼d.; damaged and cut, 3¾d. to 4¼d.

Kangaroo Skins.—Average supplies forward. Keen competition ruled for all fresh-conditioned lines, which sold readily at quotations. Damaged lots ruled slightly in buyers' favour. ¾lb. to 1¼lb. average blue skins, 2s. 5d. to 2s. 6d.; do. red skins, 2s. 2d. to 2s. 5d. per lb.; ¾lb. to 1½lb. average blue skins, 2s. 2d. to 2s. 3d.; do. red skins, 2s. to 2s. 3d. per lb.; 1¾lb. to 2lb. average blue skins, 1s. 10d. to 2s.; do. red skins, 1s. 9d. to 1s. 11d. per lb.; extra heavy and very light weights, blue skins, 1s. 3d. to 1s. 8d.; red skins 1s. 2d. to 1s. 6d. per lb.; damaged lines, blue skins, 1s. to 1s. 10d.; do. red skins, 1s. to 1s. 8d. per lb.; Euro, skins, red, 1s. 3d. to 1s. 9d. per lb.; brush kangaroo, blue skins, 1s. 3d.

Tallow.—There is no change to report in this market; all forward commands a ready sale. Good mixed (in casks), to 20s. per cwt.; medium mixed (in casks), 18s. to 19s. per cwt.; inferior mixed (in casks), 17s. to 18s.; tins and oddments, 16s. to 18s.

Horns, Hair, etc.—There is a good demand for all descriptions at quotations. Horns, large and fresh, 40s. to 42s. per 100; do., small and fresh, 15s. to 17s. 6d. per 100; do., stale and perished, 5s. to 10s.; do., very small, 4s. to 6s. per 100; rough bones, to 3s. 6d. per cwt.; horsehair, to 1s. per lb.; cowhair, to 6d. per lb.

H. J. WIGMORE & CO.'S REPORT.

For the month ending 10th March we have to report as follows in connection with the auction sales of chaff in Perth and Fremantle:—Owing to the fact that supplies from farmers have considerably shortened, prices have made a decided rise, especially during the past week. This increase in price has been anticipated by us, and we have, not only through the medium of our daily reports, but also by correspondence, strongly urged our farmer friends not to continue to send down while the low rates of a week or two back were ruling. So that the movement of the market can be readily seen we will proceed to show the different prices of chaff from week to week during the past month:—

17th February.—Prime green wheaten, £3 15s.; f.a.q., £3 10s. Good medium wheaten, £3 2s. 6d. Prime oaten, £3 12s. 6d; f.a.q., £3 7s. 6d.

24th February.—Prime green wheaten, £3 10s.; f.a.q., £3 5s. Good medium wheaten, £3. Prime oaten, £3 5s.; f.a.q., £3 2s. 6d.

3rd March.—Prime green wheaten, £3 12s. 6d.; f.a.q., £3 7s. 6d. Good medium wheaten, £3. Prime oaten, £3 12s. 6d.; f.a.q., £3 5s.

10th March.—Prime green wheaten, £4; f.a.q., £3 15s. Good medium wheaten, £3 10s. Prime oaten, £3 17s. 6d.; f.a.q., £3 12s. 6d.

A careful examination of the above figures and a comparison of same with the daily arrivals will prove conclusively that whenever a glut occurred the low prices were invariably realised. Farmers, of course, had to market their chaff to prepare for their early March liabilities, and this caused a very heavy over-supply of chaff during the week ending 24th February. At that time produce buyers were very busy storing chaff, knowing well that such low prices were abnormal and could not continue. The position now is that prime green wheaten chaff, which is worth £4, will probably see £4 10s. during April, given supplies which will not at least largely exceed the demand, especially on successive days. Farmers must also understand that those merchants who have stored chaff have done so anticipating a rise, so that their interests and the farmers are identical, as we consider that it costs pretty well 10s. per ton to cart chaff in and out of store and pay the incidental expenses connected therewith. At any rate a rise of 10s. per ton is necessary to make it worth buyers while storing. In conclusion we may state that in good medium wheaten chaff we consider a rise of 10s. has occurred, and we will give one example of this. During the glut we found it extremely difficult to sell good sound wheaten chaff from Greenhills at £3. In fact, again and again we passed in the chaff at prices varying from £2 12s. 6d. to £2 17s. 6d., having determined upon £3 as the minimum price. We are now selling the same chaff at £3 10s. with far less difficulty than we had before in securing £3. The future of the market is certainly much more favourable than has prevailed for months past.

Wheat.—We strongly advise farmers not to forward their prime milling wheat to Perth or Fremantle at the present juncture. Growers must remember that, to a very large extent, the sole demand in Perth and Fremantle is for fowl feed, which need not necessarily be prime milling. This latter quality is worth from 3s. 5d. to 3s. 5½d., Perth, but the demand is not at all lively. Farmers will find a much better market at the different milling centres. Smutty, inferior, and pinched wheat is worth anything, from 3s. to 3s. 4d., according to quality and condition.

Oats.—Local Algerians are not in evidence, and during the past month only few have come to hand. Supplies are being received from Victoria, where the prices have eased somewhat. We quote good feed, f.o.b., Melbourne, 1s. 8½d.; and prime heavies, 1s. 9½d. Our advices, however, are to the effect that firmer prices may be looked for before long. Cheap freights are playing their part towards reducing spot quotes. Victorian Algerians are worth 2s. 4d. to 2s. 5d. whole, on rails, Fremantle, and 1½d. extra crushed.

Hay and Straw.—There is little or no business to report, the season not being far enough advanced.

Bran and Pollard.—The local mills do not find it difficult to fill daily wants in addition to contracts already made. Messrs. Thomas & Co.'s Northam mills, whose products we handle, cannot fill requirements, and at present have orders for bran several days ahead. This commodity is worth £5 10s., Northam, and £5 5s. on rails, Fremantle. Pollard is worth £6, at Northam and is in short supply; £6 10s. at Fremantle.

Flour.—We quote Thomas' Northam Standard at £8 15s. sacks, £9 quarters, on rails, Northam, and have our usual steady sales to report.

AVERAGE RAINFALL FOR 1904.

It will be seen that on the whole the fall for 1904 was in excess of the average for previous years. There were a few exceptions, notably in the North-West, between Cossack, Nullagine, and Broome, and in the neighbourhood of Geraldton. On the other hand, the excess was very marked due east of Perth and in the next degree south.

The monthly distribution may be seen from the following very brief description:—

January.—Very heavy in the Kimberley district; elsewhere light.

February.—Above the average in East Kimberley, but elsewhere very light.

March.—Heavy in south-west and south districts, and generally above the average.

April.—Heavy in south-west district between Perth and Albany, also in the Kimberley; elsewhere light.

May.—Mostly about an average, but heavy on the Coolgardie and Murchison fields and in the far North.

June.—Very heavy in south-west districts, above the average in the tropics and southern districts, but light in central latitudes and on the North Coolgardie fields.

July.—Remarkably heavy in the north-west and interior, normal in the west and south-west districts, and *nil* in East Kimberley.

August.—About or slightly above the average from Perth southwards, and over the goldfields; otherwise light.

September.—About or slightly below normal between Perth and Albany; heavy throughout the rest of the State south of the tropics; little or none in the tropics.

October.—Heavy south of latitude 29 degrees (Geraldton), but very little north of that parallel.

November.—About normal in south-west and south districts; elsewhere very light.

December.—A heavy fall along a strip from Geraldton through the lower Coolgardie fields to Esperance; otherwise normal, though patchy in the tropics.

RAINFALL for the Year 1904.

(Completed as far as possible.)

AND AVERAGES FOR PREVIOUS 5 OR MORE YEARS.

STATIONS.	1904.		Averages for previous 5 or more years.
	No. of points, 100 = 1in.	No. of wet days.	
EAST KIMBERLEY:			
Wyndham	3,574	80	2,858
6-Mile	4,264	64	...
The Stud Station	4,619	46	...
Carlton	3,666	56	3,314
*Rosewood Downs	2,728	74	2,671
Argyle Downs ...	3,415	77	2,559
Lisadell	...	...	2,346
Turkey Creek ...	2,872	63	2,926
Hall's Creek ...	3,055	55	2,211
Nicholson's Plains	...	...	...
Flora Valley ...	3,284	53	1,825
Ruby Plains ...	2,819	59	...
Denison Downs...	2,594	...	1,927
WEST KIMBERLEY:			
Obagama ...	4,278	64	3,371
*Beagle Bay ...	1,970	41	...
Derby	3,314	46	2,726
Yeeda	2,470	38	2,323
Liveringa ...	2,994	35	2,165
Leopold Downs	3,162	66	2,162
Fitzroy Crossing	3,091	54	2,358
Fitzroy (C. Blythe)	2,835	35	...
Quanbun ...	3,013	...	2,093
Nookanbah ...	3,179	38	1,776
Broome	2,857	45	2,404
Roebuck Downs	2,839	...	...
Thangoo ...	...	...	2,438
La Grange Bay...	1,695	48	2,022
NORTH-WEST:			
Wallal	989	32	1,770
Condon	694	32	1,635
Pardoo	1,134	30	...
DeGrey River ...	779	25	1,210
Port Hedland ...	774	33	1,806
Boodarie ...	1,007	29	1,378
Warralong ...	960	36	1,717
NORTH-WEST—*cont.*			
Mucean	1,125	34	1,516
Ettrick	1,135	30	...
Mulgie	1,325	27	1,339
Eel Creek ...	1,259	34	1,648
Station Peake ...	...	...	...
Coongon ...	824	30	1,314
Warrawagine ...	1,304	23	1,711
Bamboo Creek ...	1,335	52	2,743
Marble Bar ...	1,203	51	1,521
Warrawoona ...	1,574	34	1,678
Corunna Downs	1,107	37	1,467
Nullagine ...	1,002	36	1,654
Mt. Edgar ...	1,643	39	...
Kerdiadary ...	718	12	1,373
Roy Hill... ...	771	25	840
Middle Creek ...	...	...	...
Mosquito Creek...	1,189	34	...
Mulga Downs ...	921	22	1,349
Woodstock ...	1,259	28	...
Mt. Florence ...	1,583	31	1,551
Tambrey ...	1,665	28	1,857
Millstream ...	1,306	21	1,623
Yandyarra ...	...	...	1,116
Mallina	1,379	26	1,780
Whim Creek ...	1,534	37	2,932
Cooyapooya ...	1,078	25	1,643
Woodbrooke ...	1,538	26	1,701
Croydon	...	...	1,757
Balla Balla ...	1,002	27	1,957
Roebourne ...	1,005	29	1,347
Cossack	1,244	34	1,173
Sherlock... ...	...	...	...
Fortescue ...	1,114	28	1,039
Mardie	921	26	704
*Mt. Stewart ...	1,758	23	1,563
Yarraloola ...	1,538	18	964
Chinginarra ...	1,186	21	816
Onslow	1,648	34	789
Peedamullah ...	1,996	41	1,045
Red Hill	2,244	29	1,459
Mt. Mortimer ...	1,644	31	803

RAINFALL FOR THE YEAR 1904—*continued.*

STATIONS.	1904.		Averages for previous 5 or more years.
	No. of points, 100 = 1in.	No. of wet days.	
NORTH-WEST—*cont.*			
Peake Station ...	2,233	40	...
Wogoola ...	1,947	32	1,122
Nanutarra ...	1,759	32	1,065
Yanrey	1,586	33	1,047
Point Cloates ...	1,548	28	1,147
GASCOYNE:			
Winning Pool ...	1,848	40	1,110
Coordalia ...	...	...	...
Towara	1,842	36	980
Ullawarra ...	1,270	19	841
Maroonah ...	...	...	806
Gifford Creek ...	1,399	21	982
Bangemall ...	1,361	27	869
Mt. Augustus ...	...	...	1,213
Minnie Creek ...	1,507	29	630
Yanyeareddy ...	2,027	35	1,175
Williambury ...	1,515	34	788
*Booloogooroo ...	1,168	...	...
Wandagee ...	1,438	28	854
Bernier Island ...	1,480	36	862
Boolathana ...	1,377	35	943
Carnarvon ...	1,136	41	867
Brick House ...	985	31	...
Doorawarrah ...	1,107	35	755
Bintholiga ...	1,291	30	...
Mungarrah ...	1,252	30	726
Clifton Downs ...	1,122	30	828
Dairy Creek ...	1,289	31	567
Upper Clifton Downs	1,311	47	951
Dirk Hartog I'nd	1,782	52	1,118
Sharks Bay ...	915	37	722
Kararang ...	1,088	45	955
Meedo	989	40	847
Tamala	1,310	53	1,086
Wooramel ...	1,263	38	882
Hamelin Pool ...	1,079	46	740
Byro	983	32	822
Yarra Yarra ...	1,210	26	635
Berringarra ...	1,098	32	783
Mt. Gould ...	...	...	715
Moorarie ...	902	33	...
Wandary ...	822	19	...
Peak Hill ...	1,109	41	1,172
Horseshoe ...	1,029	45	1,292
GASCOYNE—*contd.*			
Mt. Fraser ...	844	23	...
Abbotts	958	30	1,045
Belele	1,073	25	783
Mileura	885	27	920
Milly Milly ...	1,006	30	654
Manfred	884	39	714
New Forest ...	943	37	655
Woogorong ...	894	30	714
Boolardy ...	1,118	...	666
Twin Peaks ...	703	25	...
Billabalong ...	893	28	502
Wooleane ...	1,061	36	723
Woolgorong ...	...	...	...
Murgoo	843	33	713
Yallalonga ...	951	48	...
Meka	969	28	668
Mt. Wittenoom..	836	34	583
Nannine ...	1,102	33	749
Star of the East	1,091	29	963
Annean	1,061	35	753
Coodardy ...	1,092	29	913
Cue	1,229	42	735
Day Dawn ...	1,136	41	665
Lake Austin ...	1,205	29	694
Lennonville ...	1,185	50	729
Mt. Magnet ...	1,086	43	673
Challa	861	43	669
*Youeragabbie	943	28	632
Murrum	751	21	...
Burnerbinmah ...	845	56	...
Barnong	1,250	49	...
Mellenbye ...	1,197	63	...
Yalgoo	916	52	798
Wagga Wagga ...	875	36	...
Gabyon	1,057	38	921
Gullewa	...	...	873
Muralgarra ...	...	...	...
Wydgee	...	...	...
Black Range ...	...	...	...
SOUTH-WEST DIVISION (NORTHERN PART):			
Murchison House	1,256	65	1,556
Mt. View ...	1,170	44	1,293
Miamby	1,672	72	...

RAINFALL FOR THE YEAR 1904—*continued.*

STATIONS.	1904.		Averages for previous 5 or more years.
	No. of points, 100 = 1in.	No. of wet days.	
SOUTH-WEST DIVISION (NORTHERN PART)—*continued*			
Yuin	784	31	...
Northampton	1,781	65	2,063
Oakabella	...	...	1,794
Narra Tarra	1,654	46	1,842
Tibradden	1,666	49	2,004
Myaree	1,606	77	...
Sand Springs	1,742	51	1,635
Mullewa	1,530	65	1,049
Kockatea	1,375	58	1,132
Bootenal	1,719	39	1,666
Geraldton	1,622	83	1,729
Greenough	1,305	53	1,980
Bokara	...	...	...
Dongara	1,307	54	1,946
Dongara (Pearse)	...	...	1,742
Strawberry	...	...	...
Nangetty	1,243	49	...
Minginew	1,414	86	1,585
Urella	1,148	33	...
*Yandenooka	1,634	56	...
Rothesay	1,413	36	1,037
Field's Find	1,016	57	876
Carnamah	1,428	79	1,444
Watheroo	1,932	76	1,476
Dandaragan	2,367	92	2,221
Moora	2,277	84	1,538
Yatheroo	2,829	80	2,408
Walebing	2,321	94	1,778
Round Hill	...	...	...
New Norcia	2,431	78	1,982
Wannamel	...	...	...
SOUTH-WESTERN DIVISION, CENTRAL (COASTAL):			
Gingin	3,487	98	2,939
Belvoir	3,384	92	2,885
Mundaring	4,251	112	3,980
Wandu	...	...	...
Guildford	3,457	112	3,325
Kalbyamba	...	...	...
Canning W't'r'w'ks	3,673	84	3,934
Perth Gardens	3,462	118	3,299
Perth Observatory	3,435	125	3,249

STATIONS.	1904.		Averages for previous 5 or more years.
	No. of points, 100 = 1in.	No. of wet days.	
SOUTH-WESTERN DIVISION, CENTRAL (COASTAL)—*continued.*			
Subiaco	3,226	120	3,173
Fremantle	3,068	129	2,934
Rottnest	2,558	120	2,879
Armadale	...	...	...
Rockingham	3,947	121	3,166
Jarrahdale	7,027	117	4,109
Mandurah	3,570	107	3,433
*Yarloop	4,151	128	...
Pinjarra	3,569	101	3,787
Cookernup	...	...	...
Harvey	4,188	128	3,767
Upper Murray	4,600	...	...
SOUTH-WEST, CENTRAL PART (INLAND):			
Hatherley	1,949	66	1,377
Dowerin	1,852	63	...
Momberkine	2,208	59	...
Monglin	2,549	66	...
Newcastle	3,122	73	2,008
Eumalga	2,980	84	2,028
Northam	2,431	79	1,549
Grass Valley	2,293	...	1,503
Meckering	1,986	73	...
Cunderdin	2,271	60	...
Codg-Codgin	1,876	84	...
Yarragin	1,725	66	...
Doongin	1,881	64	1,161
Cuttening	2,009	75	1,190
Whitehaven	2,777	62	1,326
Sunset Hills	2,247	78	1,449
Cobham	2,491	113	1,694
Yenelin	2,337	70	...
Mt. Caroline	...	...	...
York	2,328	116	1,691
Dalbridge	2,253	...	...
Beverley	2,322	72	1,400
Bally Bally	2,479	103	...
*Barrington	2,171	83	1,505
Stock Hill	2,253	59	...
Sunning Hill	2,665	...	1.702
Brookton	...	...	...

RAINFALL FOR THE YEAR 1904—*continued.*

STATIONS.	1904. No. of points, 100 = 1in.	1904. No. of wet days.	Averages for previous 5 or more years.
SOUTH-WEST, CENTRAL PART (INLAND)—*continued*			
Wandering ...	3,098	93	2,213
Glen Ern ...	...	...	...
Pingelly	2,273	61	1,558
Yornan	2,342	74	...
Marradong ...	3,346	107	2,679
Bannister ...	3,191	97	2,552
Narrogin ...	2,211	124	1,793
Narrogin State Farm	2,485	123	...
Wickepin ...	2,588	80	1,626
Gillimaning ...	2,082	86	...
Bunking ...	2,053	70	...
Bullock Hills ...	1,669	71	...
Bullingarra ...	...	...	...
SOUTH-WEST DIVISION (SOUTHERN PART):			
Bunbury ...	3,338	122	3,687
Collie	3,343	137	...
Glen Mervyn ...	3,238	103	3,493
Donnybrook ...	3,460	116	...
Boyanup ...	3,692	124	3,646
Ferndale ...	3,235	119	...
Busselton ...	2,917	136	2,933
Quindalup ...	3,387	129	3,883
Cape Naturaliste	3,004	142	...
Lower Blackwood	3,803	126	...
Karridale ...	4,152	171	4,389
Cape Leeuwin ...	3,440	197	3,502
Biddellia ...	4,278	134	...
The Warren ...	5,466	158	5,302
Lake Muir ...	3,054	127	3,055
The Peninsular...	2,729	173	...
Mordalup ...	2,654	127	...
Deeside	3,202	138	...
Riverside ...	3,218	135	3,127
Balbarup ...	3,408	122	3,490
Wilgarup ...	3,145	155	...
Bridgetown ...	3,012	139	3,285
Westbourne ...	2,498	145	...
Hilton	2,544	...	...
Greenbushes ...	3,201	106	3,665
Greenfields ...	2,898	119	...

STATIONS.	1904. No. of points, 100 = 1in.	1904. No. of wet days.	Averages for previous 5 or more years.
SOUTH-WEST DIVISION (SOUTHERN PART)—*continued*			
Glenorchy ...	2,625	88	...
Williams ...	2 093	95	2,144
Arthur	2,221	88	1,789
Darkan	2,229	65	2,068
Wagin	2,008	100	1,642
Glencove ...	1,921	117	1,846
Dyliabing ...	1,824	101	1,577
Katanning ...	2,023	116	1,636
Kojonup ...	2,778	128	2,079
Broomehill ...	1,977	107	1,796
Sunnyside ...	1,984	128	1,784
Talbot House ...	...	...	...
Woodyarrup ...	1,908	104	...
Mianelup ...	1,867	109	...
Cranbrook ...	1,952	...	1,757
Toolbrunup ...	...	...	...
Tambellup ...	...	...	...
Blackwattle ...	2,316	92	...
Woogenellup ...	2,373	122	...
Mt. Barker ...	2,999	143	2,632
Kendenup ...	2,753	124	...
St. Werburgh's	2,642	139	2,550
Forest Hill ...	3,420	162	3,294
Denmark ...	4,572	120	4,770
Grasmere ...	4,346	166	...
Albany	4,378	183	3,441
King River ...	3,893	110	...
Point King ...	4,272	120	3,449
Breaksea... ...	3,381	201	2,629
Cape Riche ...	3,011	83	2,128
Cherilillup ...	1,857	...	...
Pallinup... ...	1,781	90	1,491
Bremer Bay ...	2,895	118	2,244
Peppermint Grove	3,265	145	...
Jarramongup ...	2,138	77	1,501
EASTERN DIVISION:			
Dural	1,024	34	...
Wiluna	1,077	49	1,305
Gum Creek ...	1,104	24	...
Mt. Sir Samuel...	956	35	900
Lawlers	1,146	61	876
Leinster G.M. ...	1,296	40	768
Darda	1,145	40	...

RAINFALL FOR THE YEAR 1904—*continued.*

STATIONS.	1904. No. of points, 100 = 1in.	1904. No. of wet days.	Averages for previous 5 or more years.
EASTERN DIVISION—*continued.*			
Lake Darlôt ...	...	...	1,083
Duketon... ...	...	...	...
Mt. Leonora ...	876	46	804
Mt. Malcolm ...	728	41	835
Mt. Morgans ...	1,148	38	852
Burtville ...	905	25	...
Laverton ...	1,208	51	1,094
Murrin Murrin ...	877	37	918
Yundamindera ...	970	39	...
Tampa	609	25	...
Kookynie ...	816	46	...
Niagara	728	38	810
Yerilla	1,008	42	819
Edjudina ...	1,149	46	...
Menzies	970	55	853
Mulline	887	45	...
Waverley ...	984	55	...
Goongarrie ...	1,165	50	845
Mulwarrie ...	1,251	44	...
Bardoc	896	34	...
Broad Arrow ...	1,162	55	987
Kurnalpi ...	1,174	45	901
Bulong	1,199	41	880
Kanowna ...	1,004	49	933
Kalgoorlie ...	1,072	56	955
Coolgardie ...	1,197	73	862
Burbanks ...	1,170	52	...
Woolubar ...	1,312	49	...
Widgemooltha ...	1,107	60	1,055
50-Mile Tank ...	1,276	43	984
Waterdale ...	1,221	62	...
Norseman ...	1,419	68	975
Lake View ...	1,797	77	...
Bulla Bulling ...	1,230	72	855
Boondi	1,425	73	...
Boorabbin ...	1,350	68	923
Koorarawaylee ...	1,563	55	...
Karalee	1,562	43	1,081

STATIONS.	1904. No. of points, 100 = 1in.	1904. No. of wet days.	Averages for previous 5 or more years.
EASTERN DIVISION—*continued.*			
Yellowdine ...	1,584	...	860
Southern Cross...	1,745	63	843
Parker's Range...	1,734	100	...
Parker's Road ...	1,596	45	...
Mt. Jackson ...	1,104	45	899
Bodallin	1,757	51	1,006
Burracoppin ...	1,591	47	959
Kellerberrin ...	2,023	70	1,111
Merredin ...	1,633	44	...
Nangeenan ...	1,752	...	...
Mangowine ...	2,030	66	1,064
Wattoning ...	1,541	...	920
Noongarrin ...	...	...	...
EUCLA DIVISION:			
Ravensthorpe ...	1,949	115	...
Coconarup ...	1,826	94	1,444
Hopetoun ...	2,820	97	...
Fanny's Cove ...	2,589	71	2,522
Park Farm ...	2,550	104	2,422
Esperance ...	3,351	118	2,466
Gibson's Soak ...	2,494	109	2,054
30-Mile Condenser	2,067	99	1,870
Swan Lagoon ...	1,853	85	1,550
Grass Patch ...	1,669	...	1,509
Myrup	2,939	120	...
Lynburn... ...	2,555	78	...
Boyatup... ...	2,810	102	...
Middle Island ...	2,425	109	...
Point Malcolm ...	2,466	114	...
Israelite Bay ...	1,969	106	1,445
Balbinia... ...	1,844	90	...
Frazer Range ...	1,311	46	...
Balladonia ...	994	53	987
Southern Hills ...	1,440	37	...
Eyre	1,328	85	1,105
Mundrabillia ...	1,055	44	...
Eucla	1,351	85	1,055

W. E. COOKE,
Government Astronomer.

The Observatory, Perth,
7th March, 1905.

THE CLIMATE OF WESTERN AUSTRALIA DURING FEBRUARY, 1905.

The principal meteorological feature of the month was a willy-willy which visited the North-West coast on the 8th. It struck the coast rather lower than usual, viz., in the neighbourhood of Onslow, where the barometer fell to 29·17, heavy rain fell, and a hurricane raged, doing some damage to shipping and causing loss of life. The storm then passed across the interior to the Bight, giving the goldfields a moderate and very welcome rainfall.

With the exception of the district between Geraldton and the North-West Cape the rainfall for the month was light, and below the average for previous years throughout the State. Pressure was mostly above normal, especially in western and southern districts; and temperature below, especially on the Coolgardie fields—in fact, the mean temperature for the month was lower at Coolgardie than in Perth. The figures for the extreme south-west and southern portions of the State, as usual, indicate a very mild summer. At Cape Leeuwin the mean daily maximum was 72°·0, and the highest recorded throughout the month was only 77°. At Albany the mean maximum was 71°·0, and at Breaksea only 67°·0. For cool nights, honours are pretty evenly divided between Bridgetown with a mean minimum of 47°·9 and Mt. Barker with 47°·4.

The Climate of Western Australia during February, 1905.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						February, 1905.					* Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
NORTH-WEST AND NORTH COAST:	Wyndham ...	29·809	29·792	29·926	29·665	96·9	79·1	88·0	108·6	72·8	96·0	79·4	106·0	64·0	476	11	925
	Derby	29·837	29·806	29·983	29·596	94·1	76·4	85·2	103·0	70·8	94·7	77·4	104·5	70·0	716	11	1251
	Broome ...	29·806	29·794	29·960	29·669	92·0	78·0	85·0	102·2	71·2	91·6	78·4	101·5	70·3	244	8	372
	Condon ...	29·819	29·788	29·943	29·646	95·4	77·2	86·3	110·0	73·0	93·8	77·3	113·0	69·8	103	3	118
	Cossack ...	29·808	29·776	29·948	29·638	99·4	78·4	88·9	108·2	75·2	97·3	78·5	112·2	61·8	234	2	234
	Onslow ...	29·800	29·784	29·932	29·106	94·6	73·7	84·2	106·0	68·8	96·5	75·7	115·5	66·0	186	2	234
	Winning Pool	...	...	...	...	...	...	...	...	...	...	...	...	...	171	4	171
	Carnarvon ...	29·862	29·849	30·031	29·398	92·0	72·8	82·4	105·2	67·5	88·5	71·6	111·2	63·8	279	2	279
	Hamelin Pool...	29·870	29·829	30·040	29·570	96·0	71·0	83·5	105·0	61·0	97·0	69·3	115·4	58·0	133	3	133
	Geraldton ...	29·950	29·904	30·202	29·729	86·6	66·0	76·3	103·0	55·0	84·5	65·9	110·8	51·0	41	6	47
INLAND:	Hall's Creek ...	29·838	29·826	30·038	29·759	98·5	74·3	86·4	106·7	68·0	97·2	74·9	109·0	61·3	256	9	403
	Marble Bar ...	...	...	...	...	105·6	78·3	92·0	114·8	71·0	100·7	76·7	116·8	69·7	203	8	440
	Nullagine ...	29·802	29·766	30·017	29·592	103·6	75·8	89·7	110·5	67·0	99·8	74·9	113·5	66·0	65	1	125
	Peak Hill ...	29·840	29·848	30·310	29·630	96·0	76·0	86·0	104·0	67·0	96·4	73·6	111·8	58·6	27	3	269
	Wiluna ...	29·856	...	30·159	29·491	95·0	69·2	82·1	105·4	56·0	...	...	...	...	*Nil*	...	174
	Cue	29·901	29·828	30·182	29·651	95·3	69·5	82·4	106·0	59·0	98·3	71·9	113·8	56·2	68	4	150
	Murgoo ...	...	...	...	...	...	...	...	...	...	...	...	...	...	21	3	21
	Yalgoo ...	29·879	29·838	30·215	29·611	93·5	68·3	80·9	105·7	60·2	96·7	69·0	116·2	53·9	252	4	259
	Lawlers ...	29·906	29·852	30·262	29·486	92·3	68·0	80·2	105·0	57·2	93·9	70·5	113·9	51·8	9	4	76
	Laverton ...	29·956	29·916	30·317	29·524	90·8	65·7	78·2	104·2	53·8	89·8	66·4	108·0	53·7	*Nil*	...	83
	Menzies ...	29·986	29·898	30·325	29·591	89·3	63·4	76·4	104·9	50·3	91·5	66·4	112·8	47·8	4	1	4
	Kanowna ...	...	...	...	...	86·1	60·0	73·0	104·5	49·0	...	...	...	...	53	2	70
	Kalgoorlie ...	30·020	29·934	30·347	29·646	86·7	60·9	73·8	104·2	48·0	90·2	63·7	115·0	48·2	70	2	98
	Coolgardie ...	30·015	29·928	30·359	29·604	85·8	59·3	72·6	105·0	46·4	90·2	62·1	114·3	47·4	60	3	106
	Southern Cross	30·028	29·904	30·362	29·662	88·2	59·2	73·7	103·0	50·8	91·8	62·1	112·0	46·6	52	1	95
	Kellerberrin ...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	1	14
	Walebing ...	...	...	...	...	89·1	61·2	75·6	102·8	50·0	...	...	...	...	36	4	46
	Northam ...	...	...	...	...	90·8	60·8	75·8	106·0	51·0	...	...	...	...	14	1	23
	York	30·020	29·946	29·370	29·740	89·0	58·0	73·5	102·0	47·0	91·5	60·8	115·6	45·8	5	1	12
	Guildford ...	...	...	...	...	88·5	61·1	74·8	102·2	51·8	88·4	60·2	108·8	42·0	2	2	14

* Averages for three years only.

The Climate of Western Australia during February, 1905—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						February, 1905.					* Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:	Perth Gardens ...	30·026	29·960	30·353	29·720	85·9	62·0	73·0	98·0	52·0	87·4	63·0	109·6	47·2	1	1	15
	Perth Observatory	30·036	29·956	30·372	29·726	84·5	61·8	73·2	99·0	52·9	84·7	63·4	106·8	47·7	2	2	18
	Fremantle ...	30·015	29·956	30·376	29·769	80·1	62·7	71·4	98·8	52·0	81·6	64·8	106·0	48·5	11	3	17
	Rottnest ...	30·037	29·930	30·372	29·770	76·3	63·3	69·8	90·0	56·0	78·6	65·2	109·0	56·6	4	1	12
	Mandurah ...	...	...	...	...	84·7	59·2	72·0	97·8	45·1	84·5	60·1	101·2	43·3	29	2	44
	Marradong ...	...	...	...	...	...	...	...	...	...	...	...	...	...	21	1	45
	Wandering ...	...	...	...	...	88·5	53·2	70·8	100·0	39·0	...	...	...	...	10	1	21
	Narrogin ...	...	...	...	...	81·7	54·0	67·8	96·5	44·0	...	...	...	...	8	2	22
	Collie	...	...	...	...	84·4	51·5	68·0	98·5	37·2	84·4	51·5	100·5	37·0	32	2	77
	Donnybrook ...	...	...	...	...	84·6	52·7	68·6	97·0	33·0	...	...	...	...	18	1	29
	Bunbury ...	30·079	29·990	30·388	29·785	79·9	56·4	68·2	93·5	41·0	82·7	58·7	101·5	44·2	43	3	80
	Busselton ...	...	...	...	...	82·0	53·1	67·6	94·0	41·0	81·0	54·2	95·8	43·2	12	2	41
	Cape Naturaliste	30·100	...	30·394	29·789	73·6	57·0	65·3	84·2	48·8	...	...	...	...	23	1	41
	Bridgetown ...	...	...	...	...	84·3	47·7	66·1	96·0	36·2	84·0	49·1	101·0	35·2	Nil	...	38
	Karridale ...	30·086	30·025	30·372	29·749	71·6	55·3	63·4	84·0	43·0	76·4	56·7	105·5	41·4	1	1	70
	Cape Leeuwin ...	30·090	29·990	30·400	29·780	72·0	61·0	66·5	77·0	55·0	73·6	62·3	103·8	54·8	13	3	66
	Katanning ...	30·063	29·978	30·387	29·740	83·6	54·4	69·0	97·0	43·0	84·7	55·1	109·0	37·9	7	1	24
	Mt. Barker ...	...	...	...	...	76·5	47·4	62·0	91·0	39·0	...	...	...	...	23	5	73
	Albany	30·128	30·028	30·398	29·739	71·0	55·4	63·2	85·6	40·8	73·2	57·9	94·4	41·5	31	5	104
	Breaksea... ...	30·130	30·022	30·440	29·780	67·0	59·0	63·0	79·0	52·0	69·8	60·1	81·5	50·0	32	11	80
	Esperance ...	30·108	30·024	30·442	29·812	76·7	58·5	67·6	99·2	47·5	77·6	60·5	109·8	42·2	75	6	376
	Balladonia ...	30·090	...	30·417	29·744	82·7	55·3	69·0	100·2	45·3	...	...	...	...	87	3	140
	Eyre	30·120	30·012	30·345	29·740	78·5	58·2	68·4	103·4	40·0	78·9	61·0	110·2	40·9	21	4	78
INTER-STATE.																	
	Perth	30·036	29·956	30·372	29·726	84·5	61·8	73·2	99·0	52·9	84·7	63·4	106·8	47·7	2	2	18
	Adelaide	30·023	29·979	30·295	29·710	81·0	57·2	69·1	105·4	46·4	86·2	62·0	113·6	47·4	25	3	176
	Melbourne	29·881	29·886	30·248	29·612	76·6	55·6	66·1	101·6	46·6	77·8	56·6	109·5	40·3	183	...	...
	Sydney	30·000	29·973	30·270	29·720	77·0	65·0	71·0	96·0	60·0	77·2	64·8	101·0	49·3	189	...	260

* Averages for three years only.

The Observatory, Perth, February, 1905.

W. E. COOKE, Government Astronomer.

RAINFALL for January, 1905 (completed as far as possible), and for February, 1905 (principally from Telegraphic Reports).

STATIONS.	JANUARY.		FEBRUARY.		STATIONS.	JANUARY.		FEBRUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.		No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:					NORTH-WEST:				
Wyndham ...	449	13	476	11	Wallal	54	4	173	4
6-Mile	351	11	...	...	Condon	15	1	103	3
The Stud Station	...	...	...	...	Pardoo	Nil	...	...	...
Carlton	...	...	...	...	DeGrey River ...	9	1	...	...
Rosewood Downs	...	...	...	...	Port Hedland ...	11	5	199	4
Argyle Downs ...	...	...	...	...	Boodarie ...	...	...	...	...
Lisadell	...	...	..	...	Warralong ...	60	2	...	...
Turkey Creek ...	437	11	437	13	Muccan	...	...	...	...
Alice Downs ...	428	14	...	...	Ettrick	34	1	...	...
Hall's Creek ...	147	4	256	9	Mulgie	62	2	...	...
Nicholson Plains	...	...	...	...	Eel Creek ...	...	...	...	...
Ruby Plains ...	...	...	...	...	Station Peake ...	24	2	...	...
Denison Downs...	279	...	...	...	Coongon	74	2	...	...
					Warrawagine ...	160	3	...	...
					Bamboo Creek ...	85	4	80	3
					Marble Bar ...	237	6	203	8
					Warrawoona ...	118	2	113	5
WEST KIMBERLEY:					Corunna Downs...	44	3	...	...
					Nullagine ...	75	2	65	1
Obagama ...	...	...	..	...	Mt. Edgar ...	...	...	...	...
Beagle Bay ...	118	7	...	...	Kerdiadary ...	Nil	...	...	...
Pt. Torment ...	468	13	...	...	Roy Hill... ...	...	...	...	...
Derby	535	13	716	11	Middle Creek ...	95	3	...	...
Yeeda	545	10	...	...	Mosquito Creek	87	3	...	...
Liveringa ...	405	9	...	...	Mulga Downs ...	53	2	...	...
Leopold Downs...	...	...	...	...	Woodstock ...	...	...	...	...
Fitzroy Crossing	442	7	381	8	Mt. Florence ...	213	4	...	...
Fitzroy (C. Blythe)	...	...	...	...	Tambrey ...	13	3	...	...
Quanbun ...	...	...	...	...	Millstream ...	20	1	...	...
Nookanbah ...	...	...	...	...	Yandyarra ...	...	...	...	...
Broome	128	4	244	8	Mallina	5	1	...	...
Roebuck Downs	79	2	...	...	Whim Creek ...	2	1	310	3
Thangoo... ...	...	...	...	...	Cooyapooya ...	37	1	...	...
La Grange Bay...	182	5	322	6	Woodbrooke ...	35	1	...	...

RAINFALL—*continued.*

Stations.	January.		February.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST—*cont.*				
Croydon	...	...	...	...
Balla Balla	Nil	...	...	...
Roebourne	10	1	262	3
Cossack	Nil	...	234	2
Sherlock	65	1	...	...
Fortescue	15	1	240	2
Mardie	...	...	...	...
Mt. Stewart	...	...	...	...
Yarraloola	Nil	...	...	...
Chinginarra	...	...	...	...
Onslow	48	1	186	2
Peedamullah	363	3	...	...
Red Hill	73	1	...	...
Mt. Mortimer	179	3	...	...
Peake Station	25	1	...	...
Wogoola	...	...	...	...
Nanutarra	...	...	...	...
Yanrey	...	...	...	...
GASCOYNE:				
Winning Pool	Nil	...	179	5
Coordalia	...	...	...	...
Towara	13	3	...	...
Ullawarra	...	...	...	...
Maroonah	...	...	...	...
Gifford Creek	Nil	...	...	...
Bangemall	98	3	...	...
Mt. Augustus	...	...	...	...
Minnie Creek	68	3	...	...
Yanyeareddy	10	1	...	...
Williambury	10	1	...	...
Booloogooroo	Nil	...	...	...
Wandagee	15	1	...	...
Minilya	...	...	...	...
Bernier Island	...	...	...	...
Boolathana	Nil	...	...	...
Carnarvon	Nil	...	279	2
Brick House	Nil	...	...	...
Doorawarrah	Nil	...	...	...
Bintholya	Nil	...	...	...
Mungarra	...	...	...	...
Clifton Downs	90	3	..	...
Dairy Creek	79	6	...	...
Upper Clifton Downs	65	5	...	...

Stations.	January.		February.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Dirk Hartog Island	Nil	...	...	...
Sharks Bay	Nil	...	145	2
Kararang	Nil	...	...	...
Meedo	37	2	...	...
Tamala	Nil	...	...	...
Wooramel	Nil	...	246	3
Hamelin Pool	Nil	...	133	3
Byro	76	3	...	...
Yarra Yarra	89	3	...	...
Berringarra	138	2	...	...
Mt. Gould	...	...	...	...
Moorarie	56	1	...	...
Wandary	...	..	...	...
Peak Hill	102	2	27	3
Mt. Fraser	68	2	32	3
Abbotts	72	1	24	1
Belele	10	1	...	...
Mileura	92	2	...	...
Milly Milly	4	1	...	...
Manfred	63	2	...	...
New Forest	20	1	...	...
Woogorong	116	1	...	...
Boolardy	Nil	...	Nil	...
Twin Peaks	Nil	...	...	...
Billabalong	...	...	...	...
Wooleane	Nil	...	...	...
Woolgorong	11	1	...	...
Murgoo	Nil	...	21	3
Yallalonga	Ni	...	...	...
Meka	Nil	...	...	...
Mt. Wittenoom	12	1	...	...
Nannine	74	3	22	1
Star of the East	176	2	21	1
Annean	53	2	...	...
Coodardy	75	2	...	...
Cue	82	4	68	4
Day Dawn	71	2	37	2
Lake Austin	88	2	40	3
Lennonville	28	2	76	5
Mt. Magnet	65	2	44	5
Challa	35	1	...	...
Youeragabbie	Nil	...	...	...
Black Range	118	3	...	...
Murrum	4	1	83	2
Burnerbinmah	20	1	...	...
Barnong	Nil	...	...	...

RAINFALL—*continued.*

STATIONS.	JANUARY.		FEBRUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Mellenbye ...	121	2	203	7
Yalgoo	7	2	252	4
Wagga Wagga ...	Nil	...	214	3
Gabyon	Nil	...	...	...
Tallyrang ...	Nil	...	216	2
Gullewa	Nil	...	...	...
SOUTH-WEST DIVISION (NORTHERN PART):				
Murchison House	Nil	...	26	2
Mt. View ...	Nil	...	...	...
Mumby	Nil	...	64	3
Yuin	Nil	...	175	1
Northampton ...	Nil	...	47	2
Oakabella ...	...	...	...	...
Narra Tarra ...	...	...	...	...
Tibradden ...	Nil	...	50	3
Myaree	1	1	...	...
Sand Springs ...	...	...	...	...
Mullewa... ...	16	1	121	3
Kockatea ...	12	1	...	...
Bootenal ...	...	1	...	...
Geraldton ...	3	1	41	6
Greenough ...	3	2	42,	4
Bokara	Nil	...	39	4
Dongara ...	1	1	57	5
Dongara (Pearse)	...	...	...	...
Strawberry ...	Nil	...	...	...
Nangetty ...	...	...	...	...
Mingenew ...	2	1	59	6
Urella	Nil	...	...	...
Yandenooka ...	57	1	...	...
Rothesay ...	7	1	...	...
Condingnow ...	Nil	...	...	...
Field's Find ...	Nil	...	...	...
Carnamah ...	12	1	36	4
Watheroo ...	Nil	...	...	...
Dandaragan ...	10	3	13	2
Moora	3	1	17	4
Yatheroo ...	10	1	20	2
Walebing ...	10	3	36	4
Round Hill ...	3	1	14	2
New Norcia ...	5	1	9	2
Wannamel ...	5	1	19	2
SOUTH-WESTERN DIVISION, CENTRAL (COASTAL):				
Gingin	8	2	1	1
Belvoir	18	1	11	1
Mundaring ...	16	1	...	...
Wandu	14	3	9	3
Guildford ...	12	2	2	2
Kalbyamba ...	...	...	2	2
Canning W't'r'w'ks	Nil	...	...	...
Perth Gardens ...	14	2	1	1
Perth Observatory	16	2	2	2
Subiaco	15	1	1	1
Fremantle ...	6	1	11	3
Rottnest... ...	15	2	4	1
Rockingham ...	20	2	35	2
Jarrahdale ...	20	3	31	2
Serpentine ...	13	3	36	2
Mandurah ...	15	2	29	2
Pinjarra	22	4	Nil	...
Yarloop	32	7	28	3
Cookernup ...	...	...	...	...
Harvey	32	4	30	2
Upper Murray ...	31	6	...	...
SOUTH-WEST, CENTRAL PART (INLAND):				
Hatherley ...	...	...	...	...
Dowerin ...	5	1	...	...
Momberkine ...	Nil	...	36	2
Monglin ...	5	1	...	...
Newcastle ...	6	1	11	1
Eumalga ...	6	1	8	2
Northam ...	9	2	14	1
Grass Valley ...	5	1	...	...
Meckering ...	2	1	17	1
Cunderdin ...	Nil	...	31	3
Codg-Codgin ...	4	2	51	3
Yarragin ...	67	2	...	...
Doongin... ...	Nil	...	22	2
Cutenning ...	Nil	...	...	...
Whitehaven ...	Nil	...	...	...
Sunset Hills ...	4	1	...	...
Cobham	9	3	7	2

RAINFALL—*continued.*

STATIONS.	JANUARY.		FEBRUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST, CENTRAL—*contd.*				
Yenelin	2	1	19	1
Mt. Caroline ...	Nil	...	...	...
York	7	2	5	1
Dalbridge ...	2	1	...	...
Beverley ...	9	2	Nil	...
Bally Bally ...	13	2	...	...
Barrington ...	...	...	...	...
Qualin	Nil	...	...	...
Stock Hill ...	Nil	...	...	...
Sunning Hill ...	4	2	16	3
Brookton ...	6	2	18	2
Wandering ...	11	3	10	1
Glen Ern ...	...	...	1	1
Pingelly ...	14	1	3	1
Yornan	12	2	6	1
Marradong ...	24	3	21	1
Bannister ...	3	2	...	...
Wounaminta ...	Nil	...	13	2
Narrogin ...	9	3	15	2
Narrogin State Farm	14	2	8	2
Gillimaning ...	51	2	...	...
Bunking ...	98	1	...	...
Bullock Hills ...	Nil	...	...	...
	Nil	...	...	...
SOUTH-WEST DIVISION (SOUTHERN PART):				
Bunbury ...	37	5	43	3
Brunswick ...	42	5	46	2
Collie	45	6	32	2
Glen Mervyn ...	24	6	...	...
Donnybrook ...	11	2	18	1
Boyanup ...	36	4	...	...
Ferndale ...	Nil	...	...	...
Busselton ...	29	6	12	2
Cape Naturaliste	18	3	23	1
Lower Blackwood	65	4	Nil	...
Karridale ...	66	10	1	1
Cape Leeuwin ...	53	11	13	3
Biddellia ...	82	3	...	...
The Warren ...	160	10	...	...
Lake Muir ...	23	2	Nil	...

STATIONS.	JANUARY.		FEBRUARY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST—*continued.*				
Mordalup ...	59	8	...	...
Deeside	74	7	...	...
Riverside ...	71	8	...	...
Balbarup ...	5	4	4	1
Wilgarup ...	60	7	...	...
Bridgetown ...	38	4	Nil	...
Westbourne ...	56	4	...	...
Hilton	32	2	...	...
Greenbushes ...	30	2	Nil	...
Greenfields ...	26	3	...	...
Glenorchy ...	16	2	...	...
Williams ...	7	1	51	1
Arthur	Nil	...	28	1
Darkan	Nil	...	...	...
Wagin	28	2	26	1
Glencove ...	24	3	13	1
Dyliabing ...	12	3	14	2
Katanning ...	17	3	Nil	...
Kojonup ...	14	3	15	1
Broomehill ...	15	3	7	1
Sunnyside ...	8	2	...	...
Talbot House ...	Nil	...	...	...
Woodyarrup ...	13	3	4	3
Mianelup ...	26	6	...	...
Cranbrook ...	...	...	7	1
Toolbrunup ...	21	3	...	...
Tambellup ...	15	5	2	1
Blackwattle ...	...	...	...	...
Woogenellup ...	42	5	22	3
Mt. Barker ...	50	10	23	4
Kendenup ...	21	4	5	1
St. Werburgh's...	37	8	...	...
Forest Hill ...	76	10	29	4
Denmark ...	108	6	34	5
Grasmere ...	94	12	23	...
Albany	73	12	31	5
King River ...	92	4	...	...
Point King ...	97	8	37	4
Breaksea ...	48	16	32	11
Cape Riche ...	54	3	...	...
Cheralillup ...	10	1	...	...
Pallinup ...	Nil	...	...	...
Bremer Bay ...	46	7	9	2
Peppermint Grove	55	9	...	...
Jarramongup ...	...	...	...	...

RAINFALL—*continued.*

Stations.	January.		February.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Eastern Division:				
Dural	...	...	...	...
Wiluna	177	2	Nil	...
Gum Creek ...	120	1	...	...
Mt. Sir Samuel ...	50	1	3	1
Lawlers	67	6	9	4
Leinster G.M. ...	61	2	...	...
Darda	151	4	...	...
Duketon ...	115	3	...	...
Mt. Leonora ...	32	1	19	4
Mt. Malcolm ...	40	1	16	2
Mt. Morgans ...	82	3	Nil	...
Burtville ...	55	3	...	...
Laverton ...	83	2	Nil	...
Murrin Murrin...	25	1	10	1
Yundamindera ...	26	1	7	2
Tampa	41	1	...	...
Kookynie ...	23	2	13	1
Niagara	46	2	12	1
Yerilla	41	2	Nil	...
Edjudina ...	Nil	...	...	...
Menzies	Nil	...	4	1
Mulline	40	2	6	1
Waverley ...	27	2	49	3
Goongarrie ...	18	1	29	2
Mulwarrie ...	23	3	52	2
Bardoc	17	1	44	2
Broad Arrow ...	23	1	44	3
Kurnalpi ...	41	2	25	2
Bulong	25	1	51	2
Kanowna ...	17	2	53	2
Kalgoorlie ...	26	2	72	2
Coolgardie ...	46	3	60	3
Burbanks ...	61	5	70	4
Woolubar ...	25	3	...	...
Widgiemooltha...	53	3	77	3
50-Mile Tank ...	41	1	87	2
Waterdale ...	73	4	...	...
Norseman ...	93	3	121	3
Lake View ...	67	2	...	...
Bulla Bulling ...	47	4	76	3
Boondi	78	4	90	3
Boorabbin ...	42	3	99	3

Stations.	January.		February.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
Eastern—*contd.*				
Koorarawalyee ..	51	1	114	2
Karalee	Nil	...	...	...
Yellowdine ...	Nil	...	...	...
Southern Cross...	43	2	52	1
Parker's Range...	38	1	99	3
Parker's Road ...	9	1	35	2
Mt. Jackson ...	10	1	74	2
Bodallin ...	Nil	...	...	...
Burracoppin ...	Nil	...	49	3
Kellerberrin ...	8	2	6	1
Merriden ...	11	1	36	3
Nangeenan ...	32	3	...	...
Mangowine ...	5	2	...	...
Wattoning ...	...	...	...	...
Noongarin ...	40	1	...	...
Eucla Division:				
Ravensthorpe ...	130	5	67	9
Coconarup ...	86	1	...	...
Hopetoun ...	68	3	47	4
Fanny's Cove ...	151	2	...	...
Park Farm ...	275	5	...	...
Esperance ...	303	4	75	6
Gibson's Soak ...	239	5	...	...
30-Mile Condenser	181	4	...	...
Swan Lagoon ..	224	3	...	...
Grass Patch ...	...	...	...	...
Myrup	244	3	...	...
Lynburn ...	...	...	...	...
Boyatup	135	3	...	...
Middle Island ...	...	...	...	...
Point Malcolm ...	112	4	...	...
Israelite Bay ...	127	5	99	5
Balbinia	...	...	...	...
Frazer Range ...	135	3	...	...
Balladonia ...	53	2	87	3
Southern Hills ...	241	3	...	...
Eyre	57	3	21	4
Mundrabillia ...	36	2	...	...
Eucla	25	2	16	2

The Observatory, Perth,
8th March, 1905.

W. E. COOKE,
Government Astronomer.

By Authority: WM. ALFRED WATSON, Government Printer, Perth.

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NOTES.

THE NEW DIRECTOR OF AGRICULTURE.—Mr. C. F. Chaplin, B.Sc., who was recently appointed to the position of Director for Agriculture in this State, left Brisbane on the 10th inst. for Perth, and will take up his duties in the course of a few days. Mr. Chaplin was for several years associated with the Brisbane Newspaper Company as Agricultural Editor, and was better known under the pen-name of "Koradji." Four years ago he was sent by the Philp Government to study dairying and general rural economics in the United States. A short time previous to the acceptance of the W.A. Directorship of Agriculture, Mr. Chaplin had been appointed Agricultural Lecturer to the Queensland Government, and was to have taken up his duties in that capacity this month.

ERRATUM.—In the March issue of the *Journal* a slight error was made, which appeared under the heading of "Codlin Moth," and read as follows:—"Though we have not got this plague in Western Australia." Whereas it should have read, "Though we have not got this plague in Western Australia to any extent." As a matter of fact, two years ago, seven gardens in Perth were infested; but this season there is no trace of it in Perth. In Albany, two years ago, 12 gardens were infested; but this season only one slight outbreak has occurred in a small garden.

FRUIT FROM THE LOCALITY OF THE RABBIT-PROOF FENCE.—Mr. A. Despeissis, reporting to the Acting Director of Agriculture on the above, says:—"Some particularly fine specimens of apples, grown by the Messrs. Warren, of 'Walyaming,' east of Katanning, have been sent to the department. The fruit is from a two-acre orchard, planted six years ago on pretty stiff red soil on one side of the gully and heavy black soil on the other. Apricots, peaches, nectarines, and pears, says Mr. Robert Warren, do equally well there. The garden, he also believes, is the farthest east of Katanning, being 25 miles from the Great Southern railway line and in close proximity to the recently erected rabbit-proof fence. The Messrs. Warren, who may be regarded as the pioneers of that locality, have thus demonstrated that their country is as well adapted to fruit-growing, as they have shown it to be suitable for wheat-growing and sheep-grazing. As these samples of fruit have reached me in good condition, I will prepare them for despatch to the Agent General, together with the collection of fruit I am getting ready for him."

A TEST OF GOOD FARMING.—A sound old practitioner informed us quite recently that he never judges a farmer by the appearance of the middle of a ploughed field, but he always examines the headlands and the outskirts before passing judgment. There is probably more in this than would appear at first sight, and the man who keeps his headlands and outskirts clean and cultivated can be safely left to take care of the other parts of the field. Unfortunately, however, there is a good deal of waste in connection with this, and many men pay rent for acres of land from which they get nothing, for the simple reason that it has been allowed to go to waste through sheer neglect. It is a great mistake to neglect the headlands and outskirts of ploughed fields, for the land next the fences is given up to noxious weeds and couch grass; they not only ruin this part, but they encroach further on to the portion which comes within the range of the ploughshare, and year after year a little more land is lost to the farmer. In some fields it is not easy to cross-plough at the ends of the furrows up to the outside edge, but it is false economy to give this strip up to be a natural nursery for the establishment of couch grass. The loss maintained by a comparatively small item like this is not felt so much in one year, but when one season is added to another, and a bit more land is annually given over to waste, then the item becomes serious in time.—*Mark Lane Express.*

EARLY PREPARATION OF THE SOIL.—The movement of water in the soil, usually designated as capillary action, depends upon the tension of soil particles. It is evident, then, that the finer the particles are the stronger the capillary action will be. The compactness of the soil will also have much to do in the matter. If, then, the soil of any piece of ground be of a compact nature and it have the soil particles reduced to fineness, it is plain that it will retain a higher degree of moisture than otherwise. What follows, then, as a necessary sequence? Plainly it is that every piece of land designed for cultivation should be thoroughly pulverised, and that, too, early in the season. And this intimates the fact also that deep ploughing is important. If the farmer would hope for a good crop year, he should very early in the season break up his ground, ploughing it very deep and subsoil it thoroughly. Then, before planting the crop, cross-plough, harrow, mulch; and, lastly, roll it well to insure compactness. If, before cross-ploughing, humus, or decayed vegetable matter be spread over the surface, much will be added to the moist-retaining qualities. By this is meant stable manure, rotten straw, leaves, wood, and such like; indeed, any kind of good fertilising agent. The ground thus prepared means that the main part of the labour necessary to a good crop has been performed. It also means that a good crop is almost a certainty, even though the season be a comparatively dry one. Of course, other work will be necessary. After the crop has reached the growing stage it will need ploughing, harrowing, and rooting out of weeds and sprouts. But in doing this the farmer's heart will be cheered by the rapid growth of his crops caused by the retention of moisture in the soil as a result of the early preparation. Should a drought come, keep stirring the ground with plough or harrow until the drought is over and a good crop is assured.--*Home and Farm.*

KEEPING THE FARM SEPARATOR IN A SANITARY CONDITION.—If the mechanical care of a machine is important as affecting its durability, the sanitary care of the machine is doubly so, as affecting the purity of the product which passes through it. Milk—one of the best and purest of human foods—is one of the quickest to become unfit for food if it is not kept clean and handled in clean vessels. The purchaser of a farm separator has been told again and again that it must be kept in perfect order. It is right here that the advantage of the farm separator to the farmer may turn to naught unless the fact that cleanliness, which is so essential to purity of product and to profit in the business, is thoroughly impressed upon the user. It is not enough to rinse the machine out with a little warm water and let it stand until next time. It is the slime and solid particles of unclean matter in the milk that are caught and held in the bowl. The temperature is just right to set this material to decaying at once, and if the parts are not clean, an evil smell soon develops. The machine must be well washed after every separation of milk. There are some things that the average housewife needs to learn about washing vessels that come in contact with milk. The dishcloth, as found in the average kitchen, should never be used on dairy utensils. It is the exception where one will be found to smell sweet an hour after it has been used; and yet milk utensils are often washed with it and wiped with a towel that has done duty on all of the china and glassware of the household, and possibly the pots and kettles, before the tinware of the separator is touched. Discard the dishcloth and the dish-towel when the milk utensils are being washed. Wash them in warm water first, with plenty of some washing compound—"Wyandotte," for instance, which is the best in the market—and use a brush to do the work, but never a rag. Get into every part of them, after which rinse off with clean warm water, and then either put them in boiling water or pour boiling water over them. Stand the parts up, so that they will drain, and use no cloth to wipe them. The hot surface will dry them quickly, and they will be clean. Leave the parts in a sunshiny place if possible. This may seem to be putting too much stress on cleanliness, but the evidence we have gathered shows the need of some vigorous words along this line. The outside of the frame of the separator which does not come in direct contact with the milk needs the same scrupulous care. Cases have been noted where the colour of the machine could scarcely be distinguished because of the grease and dirt or dried milk covering the paint.

SHELTERING FARM IMPLEMENTS.—It seems a pity, in riding through the country, to see farm implements of every kind, from a seed drill to a reaper and binder, left out exposed to the weather. Now, I am sorry that it seems necessary to write on a subject like this at this season of the year. A great many people who do not house their tools as they should during the summer months will find a place for them somewhere in the winter. Yet there is a class of farmers who make no pretensions of storing away all their machinery, even in winter. Sometimes the excuse is given that there is not room, or that the tools would be in the way. Occasionally this is true—more often not. Often, too, there are plenty of sheds where these things could be stored. If not, build them. It is economy. A tenant may occasionally be confronted with a lack of room and be unable to convince the owner of the need for it; but, as I said before, this is not often the case. Now, brother farmers, let us reason together. Suppose you have £300 worth of implements, buggies, and wagons (many farmers have twice as much), and neglect to shelter them, how much would you lose by it? Most of them would need replacing or extensive repairs in five years, while if kept housed continually while not in use they could last 15 or 20—let us say 15 to be liberal. This means, then, a loss of £600 during the 15 years (two replacements) from neglect to shelter the tools, or £40 annually. This would build a neat little tool shed each year, or a large one biennially, or pay for a farm hand for nine months in the year, or hire a girl all the year round for your over-worked wife. This is a very moderate estimate. We all know of men who lose more than this by such neglect. If they could be made to see the loss in some tangible form surely they would not persist in their losing game. Why! I could not sleep nights with my machinery out of doors at this season; but my neighbour seems perfectly content with his reaper and binder still in the field! Ours has never been out of the shed a day when not in use, and never a night without a canvas. It is now over 15 years old, and bids fair to live 15 more. The neighbour's fails to work every season without repairs, and he changes binders about every leap year. Some will argue that because a tool is nearly all iron it need not be housed. This is a fallacy. True, a steel frame drag will not suffer like a wood frame one; but such machines as the mower and the binder will soon be injured, iron or no iron. What is the cause of a steel bridge giving away here and there throughout the country? "From neglect of paint, rust had weakened the rods," is the too oft heard reason. So it is with machinery. It is seldom painted after it leaves the shop, and if it were the wearing parts could not be thus protected. No, brother farmer, if your tools are out in the weather, there is no excuse. You are to blame, and the sooner you realise it and get them in the better for you. Do it to-day.—S. B. H., in *Michigan Farmer*.

ILLUSTRATIONS.—Among our illustrations are some views of the work in progress at the Chapman and Hamel Experimental Farms. Two of the illustrations show the tread-power threshers at work. It will be seen that the horseworks used are worked by two horses walking on an endless platform that revolves as they work. This platform drives a fly-wheel, from which a belt may be attached to any ordinary farm machinery. The whole of the threshing was done by two horses this season. By using this kind of power about double the result is obtainable, as when the ordinary swing. Another advantage is the ease with which it can be moved from one place to another and set up ready for work in a few minutes. The other illustration shows the African Wonder Grass (*Panicum Spectabile*) after a four and a-half months growth. It is something like an enormous giant couch, but it does not get coarse and hard. It grows very rapidly and all kinds of stock seem fond of it. It grows well on light sandy soils, and has been grown by Mr. A. Price at Busselton for a considerable number of years.

RAISING COWPEAS FOR PROFIT.—"Too much cannot be said in praise of the cowpea," says a contributor in *The American Agriculturalist*. What clover is to the north, the pea is to the south. There is not a more certain, easier made, and more valuable crop raised south of the Mason and Dixon line. On our poorest sandy land, with 200 or 300 pounds of fertiliser, a crop of cowpeas can be made that will simply astonish a novice. Not only an abundance of choicest grain can be made from them, but the hay one acre will yield will three times pay the cost of the crop. The hay, if properly cured, is not just common rough feed, but in nutrition is unsurpassed. Horses, mules, cattle, sheep, goats, etc., will keep fat on the hay alone. The valuable effects of a pea crop can be seen in the land for several years. Land that is hard and inclined to run together, if treated with a crop of peas, will for several years after be open, easy to pulverise, and much more productive. Many farmers who have tried cowpeas and condemned them made the mistake of planting them too early; peas, like cotton, should be planted when the weather becomes warm. The land should be prepared and fertilised as for cotton. Care should be taken, however, in not planting them on too high a bed; if the ground needs no fertiliser, it is best to plant level, and as the cultivating progresses, work a little dirt to them. Three of the best standard varieties that we have tried are the Clay, a variety that will not rot, if left after ripening, and heavy yielders; the Carson, a tough shuck pea that will not shell out readily when vines are cut, a heavy yielder and very hardy, the best for hay of any variety. The old reliable Whippoorwill is a good variety where grain is most desired; they will bear for several successive weeks if the ripe ones are picked off. Other varieties that we have tried, and all good ones for table use, are the California and the Black, White, and Yellow Crowders; these, however, will not withstand much damp or wet weather after maturing, without decaying, but are all early, and considered the best for domestic use.

IMPROVING OPPORTUNITIES.—Evidence is not wanting that the country has awakened to the significance to technical education as applied to the science of farming. There is an increasing interest taken by the public at large in the business of agriculture. Those actually engaged in the profession are finding it more and more to their advantage to discuss problems relating to their occupation, to the exclusion of the more general topics, such as the weather, war, politics, etc. And why should they not? For too long agriculture has suffered for want of a more specific knowledge of the subject and for the want of the application of scientific truths. Now, the forces that have been at work to assist the producers of the greatest source of wealth the country has, have begun to be felt, and those most concerned are taking a greater pleasure out of the pursuit of their occupation through having acquired a fuller knowledge of the principles underlying their work. The great majority of men have learned to distinguish more clearly the distinctive characteristics of live stock and crops, and have come to realise that improvement is not merely a matter of chance or favour of fates, but the result of the operations of well-established laws which may largely be controlled, and, as a consequence, find profit and pleasure in directing these forces to their own advantage. In this fact lies the hope for the future, and encouragement to further effort. The acquirement of this broader knowledge, and its utilisation, will mark a dividing line between two classes of farmers—those who will succeed and will extract from life a fuller enjoyment, and those who continue to grope along, merely securing as remuneration for their efforts sufficient to maintain them in straightened circumstances. The youth of the land may well ponder the situation. Upon him will soon devolve the responsibility of citizenship, of the maintenance of a home, of the cherishing of the lives of wife and family. His obligation is to provide himself with a knowledge of his business,

Dam across Ellen's Brook on Belhus, Upper Swan. The springs which feed the brook fill the dam, whence the water is conducted in pipes to the irrigated vineyard and lucerne plots.

of life, and of public affairs, that will enable him to discharge his duties in a manner commensurate with the immense advantages available to those who make the effort to acquire them. Parents must also lend their support and sympathy to the rising generation. They must not assume that the education that sufficed to make a farmer twenty years ago will be sufficient for the more intense life of to-day and the future. The problems of to-day are not those of the past. Our conditions are more complicated, our problems more intricate, and to cope with these requires a mind supplied with a knowledge of principles, as well as a body endowed with physical prowess. A young man, in whatever condition of life, owes it to himself and his country to avail himself of the opportunities his country affords, and the man who "makes" himself will have the satisfaction of knowing that the task has been faithfully performed.

IRRIGATION ON THE UPPER SWAN.

By A. Despeissis.

The essence of successful lucerne-growing is a moist, deep, free loam. Much disappointment has resulted in so far disregarding the requirements of lucerne as not to provide for the plant depth of moist, permeable soil into which its roots can penetrate freely in search of nutriment.

In Western Australia it has been the cherished ambition of every newly-settled grazier and stock-owner to establish on his holding a lucerne patch. The result, however, had hitherto been in most cases a lamentable failure. True it is, that a great many, noticing the vigorous growth of a few stray lucerne plants even in most unlikely spots, such as a patch of white sand or of ironstone gravel, or even along the edge of a trodden pathway, have gone through some little trouble in extending to a larger area, and apparently under more favourable conditions, the example shown in these singular instances. The result, in most cases, has been sorely disappointing to the experimenter. Yet, when inquiring into the probable causes of the failure, it has become evident in every case that the ground was either too hungry or too shallow, or else that it was exposed for long periods to parching drought.

In support of these conclusions, derived from the inspection of scores of experimental lucerne patches, we can record, on the other hand, the success achieved where lucerne has been tried on deep, moist, loamy soil, reduced by means of thorough cultivation to a fine tilth and maintained free of weeds and other out-of-the-place vegetation.

Whilst in the middle of our dry summer I was engaged in inspecting and adjudicating on entries in connection with the artificial fodder competition held annually under the auspices of the Wellington A. and P. Society, I had pleasing evidence of what can be done in lucerne growing on the redgum and loose alluvial flats of the Harvey and on the heavy-timbered blackbutt country of the Blackwood, with blackboy and bracken fern undergrowth. On a smaller scale, I have also noticed thriving plots of lucerne on irrigated land on the late Mr. E. V. Keane's estate, "Grass Valley," also on deep, fresh karri land, as well as in moist garden land, both at Albany and Perth.

The most important lucerne fields, however, that have yet been seen in Western Australia are those recently established on specially prepared areas for irrigation by Mr. Geo. Barrett Lennard on his property at Belhus, on the upper reaches of the Swan.

The soil, as well as the site, lend themselves admirably to intense cultivation under irrigation. Until a few years ago it was under heavy red gums, a eucalypt which all Western Australian settlers know only grows in good soil, of fair depth, into which the tap-roots penetrate.

In appearance the soil is a friable brown earth of the same texture for 8 or 10 feet down, and possibly more in places.

Underneath there is a more retentive subsoil which prevents the rapid desiccation of the ground and maintains it in a fresh state; there plant roots find all the nutriment that a luxuriant vegetation demands. Evidence of that is shown by some blocks of grape vines which have not yet enjoyed the extra benefit which irrigation awards. The land, which stands as a high plateau on the right bank of the Swan and through which Ellen's brook runs, is naturally well drained, and even after drenching rains does not retain water for any length of time on the surface.

Such is the country that Mr. Lennard cleared for the purpose of turning under intensive cultivation with the help of irrigation.

This was made somewhat easy on account of the abundant water supply which, running out of springy country some distance higher up, gradually collects into the one defined bed and becomes known as Ellen's brook. Across that brook a substantial dam was constructed in the early days of the settlement of the colony by an enterprising miller. The race which once diverted the water from its natural stream and worked the old water wheel is still there, but it is by means of an eight-inch spiral steel pipe that the water is now conducted from the dam to the plateau, over which it is distributed at will and wherever it is wanted.

The illustrations show both the dam whence the water issues and a portion of the vineyard which, from the beginning of December on till February, receives several copious waterings.

That portion of the vineyard is under table grapes, and the result of the irrigation, as was anticipated, is found to considerably

Lucerne field, subdivided into check plots of $\frac{1}{2}$-acre each, under irrigation at Belhus, on the Swan. The vineyard, also irrigated, shows on the top, and the native bush in the background.

increase the production, swell the berries, and prolong the period of growth of the vines and therefore postpone the time of ripening of the grapes. The picking season is a busy time at Belhus, whence two to five tons of grapes, and at times more, are every day despatched from the vineyard to the railway station to the order of Messrs. Silbert & Sharp, the enterprising Perth and Goldfields fruiterers, who have bought Mr. Lennard's grapes for several years in advance.

But this is a side issue of these notes, whose main object is to draw attention to the striking success Mr. G. B. Lennard has achieved in growing his acres of lucerne.

Although apparently flat enough to be evenly covered with water when subjected to irrigation, the land, to the experienced eye, is susceptible of a considerable amount of grading.

With an available supply of water greatly in excess of the requirements of the large vineyard at Belhus, Mr. Lennard decided to utilise some of the surplus in growing lucerne.

For that purpose he entrusted the laying out of the ground and the drawing up of the contour plans and preparatory engineering work to Mr. James Leonard, while Mr. A. H. Scott, late of Renmark, undertook the grading and construction of the check plots.

This was done with the aid of the specially-designed "buck-scraper," introduced from the irrigation areas of California to the irrigation colonies of Mildura and of Renmark, on the Murray River. For grading work, such as is required in connection with this kind of work, the "buck-scraper" is an invaluable labour-saving implement. Seven feet in length, it is in every respect a kind of earth-scoop. A team of horses draws it forward, and a long governing handle or lever at the back regulates the depth into which the iron-shod cutting edge is made to bite. When the scoop is full it is drawn along sledge fashion until the spot is reached where a depression has to be filled; there the handle is lifted, the cutting edge bites into the ground and upturns the loaded scraper, which tips its earth where required. This goes on until all the pegs which have been driven into the ground by the surveyor, are flush with the graded surface. When this is done the plot is level, as are the tops of the pegs, some of which have for that purpose to be driven into holes scooped out of the earth where the land is too high, whilst others stand above the surface where a depression occurs, and others again have their tops flush with the surface, which is not there interfered with in any way. The surface of the ground having thus been made sufficiently even over a given area, generally one-tenth to half an acre, a 3 to 4-inch ridge, or earth-bank, is built around it, and sluice doors provided which let in water from the channel.

At Belhus the plots are about half-acre each, and experience has taught Mr. Lennard to prefer smaller plots, say, about quarter acre or a little over. The reason is evident. The smaller the blocks the less levelling there is to do and the less disturbed is the surface. If too much of the top soil be scraped away some of the richest and the most fertile ground is removed and a patch is left which is poorer in comparison with the surrounding ground left undisturbed.

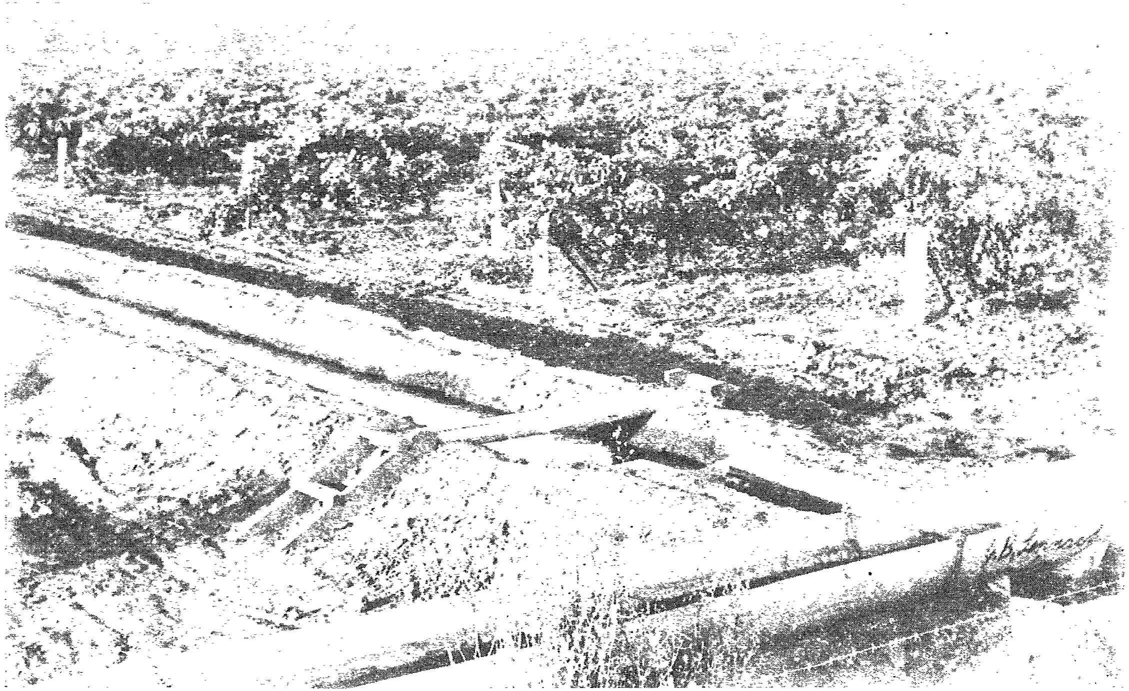
Besides, a smaller check-block is easier to flood than a more extensive one, more especially when the earth is porous and absorbent, and drinks up the irrigation water almost as fast as it is poured on to it.

Briefly stated, the check-plots, after grading and connecting with the irrigation water channels, received the following treatment:—About the middle of October last, or in the spring, the ground received a top-dressing of 3cwts. of bone-dust to the acre and was ploughed deeply and harrowed, and then lucerne seeds were broadcasted at the rate of 16lbs. to the acre, with an additional dressing of 1cwt. of bone-dust. The lucerne came up splendidly and the plots were irrigated in December; any weeds showing among the lucerne were pulled out by hand wherever showing, and the crop was cut for the first time in January, when as much as two tons of green stuff were taken on the most forward plots. The photograph here produced was taken about the middle of February, three weeks after the first cut, and Mr. Lennard expects to take one cut every growing month of summer. When these notes appear the fourth growth will be ready to cut. At present there are eight acres under lucerne, with another six and a-half acres, subdivided into plots of about half an acre each, ready for sowing. As the experiment promises in every respect to prove successful, Mr. Lennard is even thinking of extending his lucerne field, to more fully utilise both the soil and the water, which he could not, he is satisfied, turn to better account.

WEST AUSTRALIAN EUCALYPTUS BARKS.

During last year the Acting Director of Agriculture, Mr. A. Crawford, forwarded to the Curator of the Technological Museum, Sydney, a number of samples of the leaves and the bark of the various species of Eucalyptus found in Western Australia, with a view of having the value of the bark for tanning purposes, and of the leaves for oil, determined.

In response to this request, the Assistant Curator has made a most exhaustive investigation as to their values, and has sent this department his report on four of the species, which are mentioned below; and, should he be able to complete his researches, has promised to send along his report on the value of the various varieties



Portion of the vineyard under irrigation at Bellhus, Upper Swan. The galvanised iron flume, resting on an elevated earth-bank, carries the water from end to end and supplies water, on the Northern side to the vineyard and the Southern side to the lucerne field.

of leaves for eucalyptus oil in time for the next issue of the *Journal of Agriculture.* The report reads as follows: —

AN INVESTIGATION ON THE BARKS OF FOUR WEST AUSTRALIAN SPECIES OF EUCALYPTUS.

By HENRY G. SMITH, F.C.S., Assistant Curator, Technological Museum, Sydney, N.S.W.

This investigation has been undertaken for the Department of Agriculture of Western Australia so that their value for tanning purposes might be determined. The barks were from the following species:—

"Salmon Gum," *Eucalyptus salmonophloia.*
"Gimlet," *Eucalyptus salubris.*
"White Gum," *Eucalyptus redunca.*
"Mallet," *Eucalyptus occidentalis.*

The analyses were all made by the hide powder process, with identically prepared hide powder, so the results are those that would be obtainable in actual tanning practice, and are strictly comparable; at the same time one was able to form a very good opinion as to the possible colour of the leather formed and the rapidity of action of the tannin present. The extraction was with hot water, so that the maximum amounts are given.

The bark of the "White Gum" has an indifferent tannin, and will hardly be of value for tanning purposes. The liquor is of a very dark colour, and this is at once absorbed by hide, so that the result would be a dark-coloured leather; besides, the amount of tannin is not sufficiently large to attempt to overcome this difficulty, or to prepare extracts with it; the tannin is also very poor, as can be seen from the reactions.

The "Salmon Gum" contains a very good tannin, but, unfortunately, the amount present is not large. The leather tanned with similar bark would, however, be of a light colour, and perhaps would not differ very much in appearance from oak bark tanned leather. The action of this tannin on hide is rapid, and, altogether, it might be worth while to determine whether it could be obtained richer in tannin from other localities and at different times of the year.

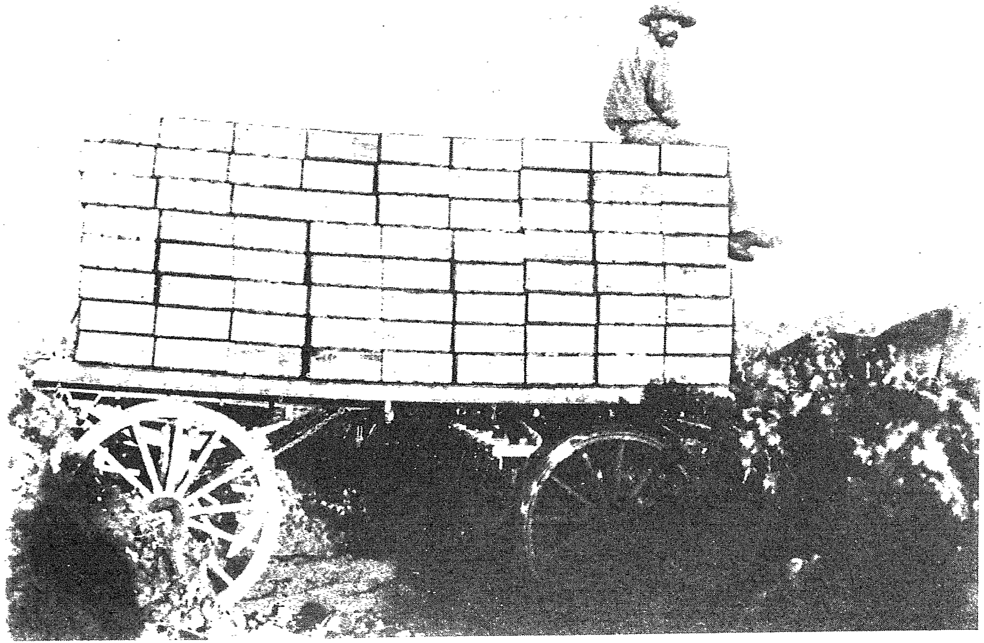
The tannin of the "Gimlet" strongly resembles that from the "Salmon Gum," and is of very good quality. Unfortunately the bark of this species is thin. The leather tanned with it, however, would be of a light colour, and its action on hide also fairly rapid. The amount of soluble non-tannins is greater than with the barks of the other species tested, but this might be found to improve in this respect if collected at other times of the year, or in different localities. Although thin, yet the bark of the "Gimlet" may be considered of some value, and might be used with advantage by local tanners. It soon dries, and, when dry, readily powders, as it is not at all fibrous.

The sample of the "Mallet" bark received was very thin, but a portion of the thick bark was procured in Sydney for comparison, and the results thus obtained are here tabulated also.

The thin bark gave a somewhat darker coloured liquor than did the thick bark, but this is accounted for by both the exterior and interior coatings of the thin bark being quite dark coloured; this might be remedied if carefully dried when stripped. The tannin is practically the same in both the thick and the thin barks, but the amount is less in the thin bark; this is accounted for by the presence in the thick bark of layers of kino, which are, of course, practically all astringent substances. The action of "Mallet" tannin on hide is fairly rapid, but the colour of the leather is darker than with either "Salmon Gum" or "Gimlet." Of course the larger yield of tannin from the "Mallet" makes the bark from this species a valuable one.

It will be observed that mention is made of different tannins in these barks. There are three distinct tannins in the Eucalypts, which fact is best demonstrated with their astringent exudations or kinos. (*See* papers H. G. Smith, Proc. Royal Society, New South Wales, 1904.) These tannins act differently on the hide fibre, and are thus not of equal value for the purposes of the tanner. This is demonstrated most forcibly by the different action on hide by the tannin of the "Ironbarks" of Eastern Australia, and by the tannin of other species, as, for instance, the tannin of the "Salmon Gum" and "White Gum." It does not follow, therefore, that Eucalyptus tannin is always of equal value, and that the only thing to be considered is the amount of tannin present in the bark. Further scientific investigation on the various Eucalyptus barks of Australia should demonstrate the suitability of many of these for tannin purposes, and bring to light economic possibilities at present little thought of.

When the barks of the "Gimlet" and the "Salmon Gum" were heated with water, white crystals were obtained, which were insoluble in boiling water. These might be thought to be Ellagic Acid; they are not that substance, however, but consist of crystals of Oxalate of Lime. Under the microscope they are seen to be stout microscopic prisms, and no doubt occur in the cells of the bark as raphides. A very small amount of these were obtained from the "White Gum" bark, but none from the "Mallet." These raphides may of course be local, or they may be peculiar to the species. It is not likely that any ill-effects will be experienced from them, but their presence in these barks is here pointed out. It is not thought that they have any influence on the particular tannin present.



A full load of grapes leaving the vineyard for the Railway Station.

The following is a short description of the physical appearances and peculiarities of the barks upon which these results have been obtained:—

"Salmon Gum" Bark.

A smooth bark, salmon tinted to grey externally. As received it had been chopped into small pieces. When cut through, the salmon tint was pronounced and extended in a considerable distance. The general thickness of the bark was about seven or eight millimetres, but in some instances it reached one centimetre. It was hard and compact, and inclined to be a little fibrous, but powdered readily. In many respects it much resembled a better class Wattle bark in appearance. There is an absence of kino (gum) veins, which are so characteristic in the thicker specimens of the "Mallet" bark.

Total extract, air-dried bark = 15·2 per cent.
Tannin ,, ,, = 8·8 ,,
Non-tannin ,, ,, = 6·4 ,,
Moisture ,, ,, = 11·1 ,,

"Gimlet" Bark.

A hard close bark, very thin, brownish to grey externally. Much of it did not exceed two millimetres in thickness, and the thickest was only five millimetres. The thickest bark had occasionally a layer of kino. The bark is brittle and readily powders. In appearance it much resembles the "Salmon Gum," but is not so fibrous.

Total extract, air-dried bark = 30·5 per cent.
Tannin ,, ,, = 18·6 ,,
Non-tannin ,, ,, = 11·8 ,,
Moisture ,, ,, = 9·7 ,,

"White Gum" Bark.

A somewhat thick bark, grey to brown externally, and the fracture of a yellowish colour. It is of a brittle, fibrous nature, but is not compact like "Salmon Gum." It powders readily. It ranges in thickness from seven millimetres to one centimetre. In comparison with the other barks it gives a very dark-coloured liquor, and the relative astringency of the tannin is also very low.

Total extract, air-dried bark = 17·65 per cent.
Tannin ,, ,, = 12·86 ,,
Non-tannin ,, ,, = 4·8 ,,
Moisture ,, ,, = 13·1 ,,

"Mallet" Bark (thin sample).

A thin bark, ranging from two to four millimetres in thickness. It powders readily, but is somewhat dark in colour, for the reasons previously mentioned.

Total extract, air-dried bark = 42·03 per cent.
Tannin ,, ,, = 33·7 ,,
Non-tannin ,, ,, = 8·3 ,,
Moisture ,, ,, = 10·8 ,,

"MALLET" BARK (thick sample).

This bark was obtained in Sydney, and was a commercial sample of chopped bark. It had a thickness of from five millimetres to one centimetre, and had the characteristic layers of kino interspersed between the bark. It readily powdered, giving a fairly light powder. The tannin in the liquor was readily and quickly absorbed by hide powder.

Total extract, air-dried bark = 52·7 per cent.
Tannin ,, ,, = 40·5 ,,
Non-tannin ,, ,, = 12·2 ,,
Moisture ,, ,, = 13·4 ,,

The relative astringency value was taken on liquor having a strength of two grams of powdered bark per litre, and titrating with potassium permanganate (one gram per litre), using indigotin as an indicator, practically a modified Löwenthal's process, but with this difference: that the values are calculated from the gravimetric results with hide powder. Ten c.c. of the several liquors required permanganate solution, as follows:—

"Salmon Gum"	1·8 c.c.
"Gimlet"	3·1 c.c.
"Mallet," thin	4·6 c.c.
"Mallet," thick	4·6 c.c.
"White Gum"	1·3 c.c.

Gallo-tannic acid (air-dried), one gram per litre, was taken as a standard; 10 c.c. of this required 9·1 c.c. permanganate. If this is fixed at 1,000, then the relative values of the barks are:—

"Mallet," thick = 505
"Mallet," thin = 505
"Gimlet" = 341
"Salmon Gum" = 198
"White Gum" = 143

But by dividing these numbers by the percentage of total extract, or by the percentage of tannin, we get the relative astringency values of the tannin present:—

	On total extract.	On tannin value.
"Salmon Gum"	13	22·5
"Gimlet"	11	18·3
"Mallet," thin	12	15
"Mallet," thick	9·6	12·5
"White Gum"	8	11

It is thus seen that the tannin of "Salmon Gum" is relatively more astringent than that of the other barks tested. The influence of the kino in the bark of the "Mallet" is also well shown by the astringency results, as the value of the pure kino itself was only 423, while some Eucalyptus kinos have an astringency value of over 840. The determination of the relative astringency values of the several kinos of the Eucalypts has been most useful, and has assisted much in their investigation. It was thought, therefore, that some useful results might also be obtained with the Eucalyptus barks in the same direction. This will be more apparent as the results from the numerous species accumulate.

QUALITATIVE RESULTS.

No very distinctive results were obtained with reagents generally, except the marked differences between the "White Gum" and the others. For these tests the solutions were all made as nearly as possible the strength of the liquor of the "Salmon Gum" (which was 10 grams bark per litre). The "White Gum" gave no precipitate with lime water; precipitates were obtained with all the other, very marked with "Salmon Gum" (five minutes allowed).

The "White Gum" gave no precipitate with potassium bichromate, but a red colour; brown precipitates with all the others (10 minutes allowed).

The "White Gum" gave no precipitate with either zinc acetate or uranium acetate; brownish precipitates with all the others.

The "White Gum" gave no precipitate with ferric chloride, even after one hour only a reddish coloration; dark blackish-brown precipitates with the others. These solutions were diluted to one in four and two drops of $Fe_2 Cl_6$ added to full test tube. It was seen that with "Salmon Gum" and with "Gimlet" the colour was greenish, soon changing to a dirty brown tint; with "Mallet" it was more bluish green, but all gave identical precipitates on standing.

Bromine Water gave orange yellow precipitates with all, most pronounced with the "Gimlet."

Cupric sulphate gave slight precipitates with all, and on adding ammonia in excess, brown precipitates were obtained, with the exception of "White Gum," in which a precipitate could hardly be detected.

March 30th, 1905.

[EDITORIAL NOTE.—The reproduction of this article by any journal is prohibited unless the usual acknowledgment is made.]

HOME TREATMENT OF HORSE COLIC.

First you want to know its symptoms, and then the proper treatment. Often a veterinarian is not at hand, and something needs to be done before he can be reached; or he may be preoccupied and a long distance away, before he can reach you.

In determining just what the trouble is, consider that colic is a pain in the bowels, caused usually by an irritation from food; it may be from imperfect digestion, or from some substance that is foreign and never could be digested. Usually colic arises from gas proceeding from food not properly digested; sometimes the cramping, as in other cases of cramps, may be the result of nervous affection. This may be from a sudden cold or other cause acting on the nerves.

The symptoms are pretty well known. The colic always seems to come on rapidly and unexpectedly. "The animal," as one horseman describes it, "becomes uneasy, manifests pain by looking at its side, by pawing, turning up the upper lip, and as the pain increases, lies down and rolls. The breathing becomes hurried, and in severe attacks there is profuse sweating. The animal also shows by his countenance that he is suffering intensely. In some cases the pain is spasmodic, there being short intervals of ease. In some cases bloating is a very prominent symptom."

TREATMENT.

First, give the animal a large, roomy, well bedded place, and allow him to manœuvre as he wishes, unless, when badly bloated, he throws himself violently, in which case restrain him. A cool place out of doors where there is soft turf is better in warm weather. Never run the horse or cause him to exercise violently. A little walking exercise is not detrimental, but it is best to let him roll as he wishes. Medicinally give those drugs which will rapidly stimulate the bowels to activity, and also drugs to allay pain, and in case of bloating, drugs to prevent the formation of the gas. There are one or two well-known proprietary preparations that most farmers have on hand which meet this purpose. Among the common household remedies, any of those which are used with similar troubles in the family may be given in doses from 12 to 15 times the dose for a man. Give an ounce or two of common ginger, or an ounce of Jamaica ginger, for instance. If the animal has not over-eaten, baking soda is beneficial. An ounce of alcohol or two or three ounces of whisky in a half-pint of water, or two or three ounces of sweet spirits of nitre, will help; this particularly, if there is difficulty in passing urine.

A mixture which can be kept at hand is the following:—Aromatic spirits of ammonia, ½ oz.; sulphuric ether, ½ oz.; fluid extract of jarborandi, 2 drachms; fluid extract of calibar bean, ½ drachm; fluid extract of belladonna, 1 drachm; hyposulphate of soda, 2 ozs.; water to make ½ pint.

Give as one dose. Repeat in from one-half to one hour, if necessary, and again in an hour and a-half, if conditions require. If bloating is a marked symptom, give, in addition to the above, two to four ounces more of hyposulphate of soda dissolved in a half-pint of water, or two to four drachms of salicylic acid in one-half pint of oil, or an ounce of turpentine in a pint of oil. If these should fail to arrest the fermentation and the bloating continues, the animal must be tapped. For this operation the small trochar and canula are used, and the operation had best be performed by a veterinary surgeon.

WHEAT EXPERIMENTS WITH CHEMICAL MANURES.

By E. A. Mann (Government Analyst.)

The following is a note showing the result of some experiments carried out in the Government Laboratory, Wellington Street, during 1904:—

The results are in some cases very interesting, but, unfortunately, the size of the plots (which were made in the Laboratory grounds) was too small to make any very reliable deductions possible.

The soil was very poor sandy quality, giving the following average percentages of fertilising constituents on five samples:—

Phosphoric Acid (P_2O_5)	·0074
Nitrogen (N_2)	·0310
Lime (CaO)...	·0800
Potash (K_2O)	·0120
Chlorine (Cl)	·0018

The number of plots prepared was 15 manured and three unmanured, of $\frac{1}{500}$ acre each. These were all prepared and Steinwedel wheat sown between May 17th and 24th, 1904. The amount of seed sown was three ounces per plot (equivalent to $1\frac{1}{2}$ bushels per acre), distributed among 16 rows in each plot, and drilled in by hand.

Fertilisers were added in the following forms and quantities, alone and in various combinations, to illustrate the special food requirements of the wheat and ascertain the particular deficiencies of the soil.

Phosphates:	
Superphosphate (16 per cent. P_2O_5) ...	4 cwt. per acre
Thomas's phosphates (16 per cent. P_2O_5)	4 cwt. ,,
Bone-dust (originally 22 per cent. P_2O_5, but reduced to 16 per cent. at time of weighing)	4 cwt. ,,
Sulphate of potash (50 per cent. K_2O) ...	$\frac{1}{2}$ cwt. ,,
Nitrate of soda (16 per cent. N)	1 cwt. ,,

The nitrate of soda was added in the form of top dressings to the young crop in two successive dressings during the spring.

Each plot was grown under the same conditions, except that those in which superphosphate was used, were rather exposed to cold winds—and which doubtless had some effect on the yield.

The rainfall was good throughout, but was rather too heavy towards the close of the season.

The fertilising constituents of the soil were by the above manuring increased by the following amount (the weight of soil per acre one foot deep being reckoned as 3½ million pounds):—

	per cent. in soil.
Phosphoric acid	·0020
Potash	·0008
Nitrogen	·0005

Half of each plot was cut for hay, the remainder being left for wheat.

The following table gives the results in hay yield:—

1.	Class of Manure.	Weight per plot, in lbs.	2. lbs. per acre.	3. Money value in Perth, at £3 16s. per ton.	4. Cost of manuring plus money value of unmanured plots.	5. Money value due to manuring after deducting column 4.
		lbs.	lbs.	£ s. d.	£ s. d.	£ s. d.
Plot No. 1.	Superphosphate only	3½	1,750	2 19 5	2 16 0	0 3 5
" 2.	Thomas's Phosphates only ...	4	2,000	3 7 10	2 6 0	0 14 1
" 3.	Bone-dust only...	4	2,000	3 7 10	2 16 0	0 11 10
" 4.	No manure ...	2½	1,250	1 18 0	...	...
" 5.	Superphosphates and potash ...	3½	1,750	2 19 5	3 3 0	*Nil*
" 6.	Thomas's Phosphates ...	4½	2,250	3 16 4	3 0 0	0 16 4
" 7.	Bone-dust and potash	2½	1,250	2 2 5	3 3 0	*Nil*
" 8.	Nitrate of soda...	4	2,000	3 7 10	2 12 0	0 15 10
" 9.	Superphosphate, potash, and nitrogen ...	3½	1,750	2 19 5	3 17 0	*Nil*
" 10.	Thomas's Phosphate, potash, and nitrogen...	6	3,000	5 1 9	3 14 0	1 5 10
" 11.	Bone-dust, potash, and nitrogen ...	4½	2,250	3 16 4	3 17 0	*Nil*
" 12.	Potash and nitrogen	5	2,500	4 4 10	2 19 0	1 5 10
" 13.	Superphosphate and nitrogen ...	3½	1,750	2 19 5	3 10 0	*Nil*
" 14.	Thomas's Phosphate and nitrogen	6	3,000	5 1 9	3 7 0	1 14 9
" 15.	Bone-dust and nitrogen ...	5	2,500	4 4 10	3 10 0	0 14 10
" 16.	Potash only ...	3	1,500	2 10 11	2 5 0	0 5 11
" 17.	No manure ...	2	1,000	1 18 0	...	...

It is seen that the best results were obtained in plots 10, 12, and 14, and that the most effective combination was that of nitrogen and Thomas's phosphates, the latter appearing to be in all cases more successful than other forms of phosphatic manures.

The wheat results, which time did not permit of working out so fully, pointed to the same conclusion, the best result obtained being a yield of 13 bushels per acre on plot No. 14 against $4\frac{2}{3}$ bushels without manure, or an increase due to manuring of $8\frac{1}{3}$ bushels.

BUNT AND SMUT.

Their Life History and Methods of effectively dealing with them.

By FRANK L. FAULKNER.

Bunt or Stinking Smut (*Tellitia caries*) and Smut or Powder Smut (*Ustillago carbo*) are two fungora diseases very prevalent in wheat and other cereal crops. Next to Rust, they are the cause of more trouble and loss to the Australian farmer than any other disease in cereal crops. In many respects they resemble each other, and in speaking or reading of them and in treating them they are very often confounded. This fact is most important, as differences in the method of development, and sporification or seeding, necessitate a different method in the preventative treatment.

Bunt, or *Tellitia caries*, principally attacks the wheat plant. It not only affects the quantity of the crop, but the quality is also seriously impaired by the dark colour of the grain and the characteristic disagreeable fishy smell that it imparts to the produce. The disease is not readily detected in a growing crop, by the inexperienced, as it does not effect the external appearance of the wheat plant very much, excepting that it makes the plant affected develop more slowly than its fellows, but as ripening approaches the head of the plant assumes a dark blackish-green appearance.

The *Mycelium* or growing body of the Bunt plant develops and grows up through the internal tissues of the wheat plant, following it in its growth right to its extremities. As the grain of the wheat develops and ripens, the Bunt plant also fructifies in the wheat grains, consuming the glutinous and starchy matter contained therein, and in its stead developing thousands of Bunt spores or seeds. Everyone of the grains thus attacked—instead of being another to help swell the harvest—is a source of contamination, and seriously affects the milling value of the rest of the crop. The black spores found in the grain shell, or Smut Balls, as it is generally called, are the restings pores of the fungus, and in this state they are capable of germination (even when eight or nine years old). They will also stand wide extremes of temperature, but are caused to germinate readily with very slight moistures.

This fact is often the reason why Bunt seed sometimes gives a good clean crop, the light dews germinating the Bunt spores, but by not being sufficient to swell the wheat grains, the young Bunt plant dies for want of a host. This will be more readily understood when it is explained that the Bunt plant is a parasitical fungus not capable of sustaining itself in a legitimate and honest manner, but must have a host on which to live. The Bunt spore, which is very minute indeed when it germinates, throws out a very minute sucker or (*promycelium* tube), which is capable of throwing out other secondary branches. The whole structure, however, is so microscopically small and tender that, unless it happens to germinate in very close proximity to the emerging wheat plant, and at an opportune time, it fails to become attached and soon looses its vitality. Self-sown crops are seldom or never Bunted, as, even if the grains become polluted, the spores are germinated by light rains and dews, and die before there is sufficient moisture to start the wheat.

The smallest imaginable speck of one of these Bunt or "Smut Ball," as they are called, is capable of affecting every ear of wheat, and if it were possible to distribute them evenly, one ball would be sufficient to pollute a bag of wheat. This fact makes it easy to understand how seed sown, that is to all appearances free from Bunt, will give a dirty crop.

A dirty drill, in which a few balls have got broken, will pollute a whole field. The treatment generally adopted for suppressing Bunt is either that with a solution of bluestone (copper sulphate); of formalin (formic aldehyd); or by steeping in hot water 125 to 135deg. F. for a period of five to ten minutes. The most general method is with bluestone, although of late, formalin has become more popular.

It matters little which of these two chemicals are used as fungicides, as they are both sufficiently effective. More importance, however, should be attached to the method of procedure than to any differences in the results of the two chemicals. The old-time method of shooting the grain on a floor, sprinkling it with the prepared solution, turning it with a shovel, and then returning it into the polluted bags, should be condemned as poor and unreliable in its effects, and at the same time laborious and slow. The easiest and most effective way in which to pickle is to have a hogshead with nine or ten inches cut off the top and the hoops all painted, or a small cemented dip, two feet by two feet and two feet six inches deep, in which to do the pickling, having a few sheets of galvanised iron on a strong frame, or a cement draining table, made to hold and drain five or six bags of wheat. A second receptacle is very useful, in which the solution is prepared and bucketed into the other as required. The solution used will vary, according to the state of the seed affected, from a two per cent. down to a one per cent., in the case of bluestone, and from one in 300 to one in 400 in the formalin. The solutions are readily calculated and measured out by estimating a kerosene bucket at 10 gallons, or 40lbs. Thus, five buckets of water and four pounds of bluestone give a two per cent. solution, and one pound of formalin to 10 buckets of water make a one in 400 solution.

With the bluestone, the crystals are readily dissolved if they are kept near the surface of the liquid by suspension in a small bag; whereas, if allowed to sink to the bottom of the cask they are very slow to dissolve. The seed should be put up into fair, handy-sized parcels. Thomas's phosphate bags are very handy, although by making two bags into three ordinary wheat butts handy-sized parcels are made.

In pickling the bag, bag-top and all should be thoroughly immersed, and half to one minute is sufficient to thoroughly saturate the bagful.

After pickling it is preferable, if possible, to let the seed dry for several days before sowing. In the case of seed containing unbroken Bunt balls the seed should all be floated and the floating scum skimmed off carefully. By this treatment every unbroken ball will float, and by its omission the unbroken balls, which will take a long time to become affected by the pickle, will crack while the grain is being handled and while going through the drill. In the latter case the drill becomes polluted and so imparts fresh spores to the grain as it passes through it. This fact explains the stupid complaint frequently heard, "That the use of the seed drill and fertilisers was inducive to rust."

Treatment with hot water is seldom practised for Bunt, as it is more laborious and slow, whilst the afore-described treatments are effective, quick, and cheap.

Smut *(Ustilago carbo)* or Powder Smut.—The development and growth of this fungus are largely the same as of *Fellitia Caries* until the spore-forming stage is reached. At this stage Powder Smut consumes the grain, the chaff, and practically the central stem of the head, and deposits a loose, greasy-like mass of spores in their stead. This parasite is not generally troublesome with wheat, but is very bad with oats and barley. The treatment with copper sulphate or formalin is not sufficient to destroy all these germs, as they frequently find their way underneath the outside covering of the grain and often become overgrown by the grain. The most effective treatment in this case is to steep the grain for from five to ten minutes in water at from 125° to 135° F. Care must be taken in drying the seed well after this process, or it will start to sprout and go mouldy or malt.

NOTICE.

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ROTARY WINE PRESS: THE "IDEAL."

By A. DESPEISSIS.

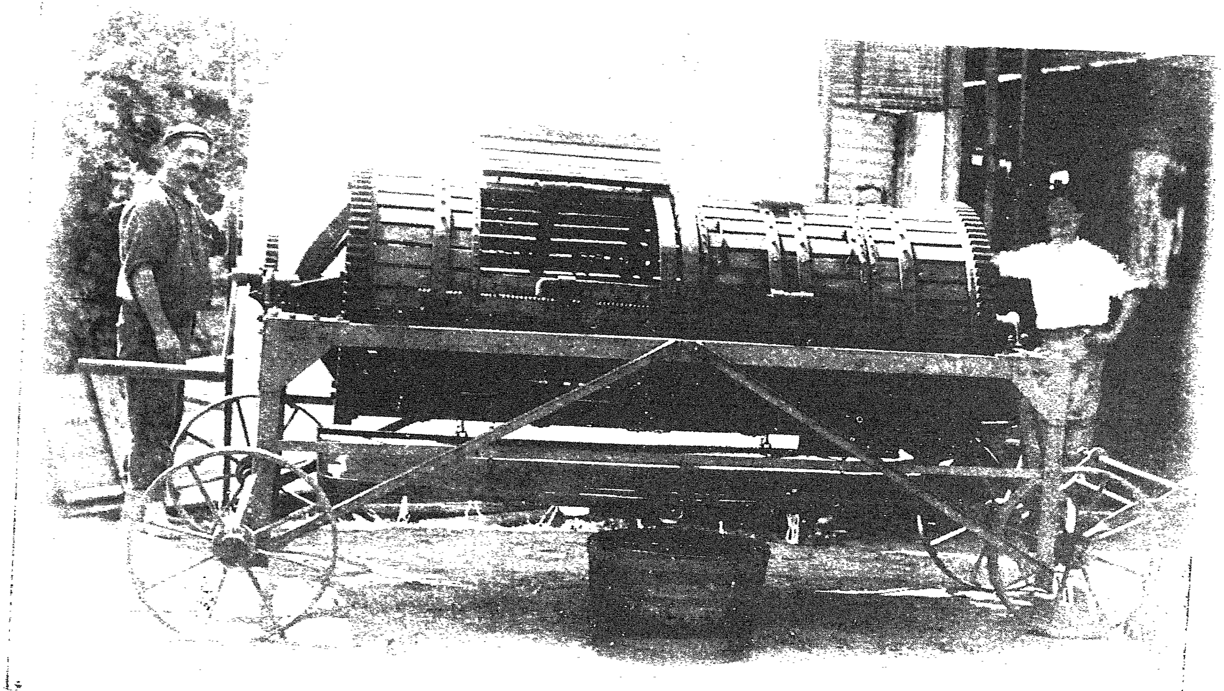
An ideal wine press is one that does its work the most thoroughly and without squeezing from the skins and stalks any excess of juices injurious to the wine, that does it in the shortest time, requires a minimum of force to work, is easily moved from place to place, is easily cleaned and operated, and is so constructed that it does not readily get out of order.

The system and patterns of wine presses in use are numerous, and range from the old beam press to the modern continuous press. Whilst at Montpellier in October, 1903, I had the opportunity of witnessing a trial then being conducted by the Director of the National School of Viticulture, of an entirely new system of wine press which exhibits several striking and novel features.

As the accompanying illustration shows, it consists of a solidly constructed oblong framework on which rests a screw axle, the thread of which starting from a dead-end in the middle, turns in opposite directions towards its extremities.

On that screw-axle work two circular cast-iron head plates, which, according as the pressure as the case may be, is put on or reversed, and drawn together or driven in opposite directions. These cast-iron head-plates move within a strongly-constructed cylindrical oak cage which is made to revolve horizontally by means of the cog-wheels crowning each extremity. Two sufficiently capacious trap-doors on the side of the cylindrical cage permit of loading and unloading the press. A light sheet-iron tray suspended by chains hangs underneath the cage of the press and collects the running juice, conveying it to a tub, whence it is transferred, by means of a pump or of buckets, to the casks prepared for it. The illustration shows one trap-door open and the other closed. One man alone can work this rotary press, and this is done by means of the handle which can, at will, be fitted on at either end of a spindle working sets of cog-wheels. The arrangements of these cog-wheels is such that when fastened on the right of the press the revolutions of the apparatus are three times greater than when fastened on the left-hand side where slower speed is attained but greater power is exerted. On the larger size presses, the handle is replaced by a wheel of large diameter with wooden pins set at intervals in the rim, like the rungs of a ladder. This allows of great force being transmitted to the press, and it also permits the operator to apply the pressure, without the least muscular exertion, by simply stepping on the wheel and causing it to thus revolve by his own weight.

The whole operation of pressing is effected in less than half the time taken by the screw presses, known as "American," of which the Mabille press is a type. It is done with less labour,



New Horizontal Rotary Wine Press. Imported from France by Mr. A. Despeissis.

and the work is done more thoroughly without, as in the case of the powerful "continuous" presses, squeezing sappy juices and crushing vegetable cells, as is at times the case when the degree of pressure has been carelessly regulated. Besides time economised, the rotary press possesses another distinct advantage: it is known that whenever a large bulk of grape skins are put in the ordinary press there is left behind a notable quantity of juice, which can only be extracted by opening the press, cutting the cake with fork and shovel, and putting on pressure afresh. As this operation involves a certain expenditure of time, it is often deemed unnecessary amongst Australian wine-makers who may think that the resulting amount of juice extracted does not justify the extra trouble and expenditure incurred.

With the "Rotary Press" this work is automatically done without the least trouble, and within half-an-hour. After the first pressing, and when the juice stops running rapidly, the machine is reversed. This draws the circular heads apart, and in doing so a few iron hoops connected with one another and with the cast iron heads by means of lengths of chains, break up the compressed cake into which they are embedded. As the cage of the press revolves at the same time, that cake crumbles down into lumps after the pressure has been withdrawn. After a few minutes the whole mass of skins rattles inside the machine when pressure is put on again, with the result that a notable amount of juice is collected, which would otherwise have been lost to the wine-maker. When no more juice worth collecting is left, the pressure is released, the movable heads again driven asunder, the trap doors are removed, and the whole crushed mass tumbles into the sheet-iron tray underneath the press, whence it is shovelled into a cart and taken away.

As the result of the test I saw conducted at the National School of Viticulture at Montpellier, an "Ideal" Rotary Press of large size extracted three per cent. more juice than an American press of the Mabille type of the same capacity; this it achieved in one-fourth the time and with no trouble whatever, by two men only, whereas the other press required four men. At Saint George's d'Orques, a village some little distance from Montpellier, I also saw another of these presses at work at the mayor's cellar. Its advantages appeared to me so evident that I lost no time in placing an order on behalf of the Santa Rosa Wine Co. with the local agent at Montpellier, Mr. Gay, and in due course the makers at Saint Etienne, Messrs. Michalon and Pailleret, sent it on *via* Marseilles by Messageries Maritimes boat. The press here illustrated, of which eight sizes are made, is a medium size one, which can deal, when fully charged, with fermented skins of three tons of stalked grapes at the one pressing. The dimensions of the cage are 2 feet 6 inches by 6 feet, and costs at the works £35. Packing, railage to port, freight, duty, insurance, and other charges amount to the relatively high sum of £40, but in spite of this high cost I consider that, in labour saved and excess of wine extracted, this "Ideal" press nearly paid for itself after the first vintage, while after the second one just over, a substantial credit stands to its account.

INSPECTION OF FRUIT TREES AT FREMANTLE.

A correspondent has written asking for information as to the inspection of fruit trees arriving at Fremantle from the Eastern States; also whether it would be better to purchase trees within or outside this State. He also gives quotations received from Victoria for orange and lemon trees at per 100 delivered at Fremantle.

The letter was handed to the Horticultural and Viticultural Expert, and he replies as follows:—

"On arrival at Fremantle or at another recognised port of entry, the consignment must be immediately removed to the disinfection shed. Within 24 hours the consignee or his agent must, in the presence of the local inspector, unpack and prepare the parcel of fruit or plants for inspection.

"If the examination reveals the presence of rooted vines, mussel scale, mining scale, San José scale, wax scale, fruit fly, codlin moth, or insects or fungus or other diseases injurious to fruit and plants, and not known to exist in Western Australia, the parcel is seized and destroyed.

"If other diseases exist which are deemed less injurious, the local inspector retains the parcel in quarantine for a period of 14 days, or until it can be determined whether the plants are free from injurious insect pests, when, after inspection and disinfection, they are released.

"Other fruit or plants apparently free from pests are likewise disinfected after inspection, and a certificate issued after the cases or packing material have been disinfected or destroyed, and after the fee for inspection and disinfection has been paid.

"After disinfection, consignees or their agents must repack the fruit or plants and remove the same within 24 hours.

"The fees for the inspection and disinfection of 300 to 400 trees amount to 9s.

"With reference to importing trees against buying them in this State, I have to advise that it is generally acknowledged that the less the root system of a plant is exposed to the air, the more chance it has of striking roots when planted out, and of establishing itself; and therefore it is deemed an advantage to have the nursery close to the ground it is intended to plant.

"The prices named in your letter are also those ruling in local nurseries for most stocks usually grown. Novelties, specially well grown trees, or a few kinds generally mentioned in catalogues, command a little more."

FRUIT FLY PARASITE.

Early in February Mr. Piaggio, of West Guildford, conveyed the news to the Department that he had in his possession a parasite of the fruit fly. On investigating the matter, the Horticultural Expert was shown a small insect which had been noticed attacking a fruit fly maggot as it was wriggling its way out of an infested peach lying on the ground. To this maggot the small insect had made fast by means of its mandibles, and a few hours after the maggot was found to be dead and only the dried-up remains were left, while the crawling insect, which had been very active before the attack, lay down in a satisfied state. This predaceous enemy of the fruit fly maggot was taken to the Department of Agriculture for a preliminary examination, and was shown to be the larvæ of a ground beetle. It has since been forwarded for identification to Mr. A. W. Lea, the Tasmanian Government Entomologist. In connection with this observation, it is interesting to note that on his return from Brazil last year, Mr. Compère brought with him some very active ground beetles, which in that country are amongst the most ferocious enemies of the fruit fly maggots there. A number of these predaceous insects were liberated in a garden in Perth, which promised to prove for the introduced insects a happy hunting ground. Although seen alive some time after being liberated, they have not been observed since, but it is reasonable to believe that they are still about.

AMMONIA GAS.

By E. A. MANN (Government Analyst).

I think it would be as well to show the fallacy of the misleading statements which are sometimes published in so-called scientific journals.

I recently had inquiries from a farmer as to how to make ammonia gas, and on inquiry found that his curiosity had been prompted by the following paragraph from a journal:—

"EXPERIMENTS IN CHEMISTRY.

"On the other hand, if we pulverise a pound of salammoniac and mix it with an equal quantity of fresh slaked lime, moisten the mass with water, and place the mixture in a close iron vessel, and apply heat, ammonia gas will be evolved abundantly. If we connect the upper part of this vessel by a small iron tube (supplied with a check valve) with a barrel of water, before applying heat, the water will absorb and dissolve about 600 times its volume of the gas, and, as a result, we have a barrel of one of the finest fertilisers known to science. The cost is but a trifle, and it may be prepared in any quantity on any farm. When this ammonia water, further diluted, is poured about the roots of plants, it produces a phenomenal growth. But now if we analyse a grain of corn produced in this way we do not find ammonia. That develops during the slow process of decay.

"VALUE OF MANURE.

"It is to ammonia and nitrogen that stable manure owes its value. But as a factor itself in successful farming, the plough itself, run deep, stands pre-eminently at the head. Good advice is this, 'Plough deep while sluggards sleep, and you'll have corn to sell and keep,' is the best maxim ever laid down for farmers. I have seen the yield on two farms, reputably poor, brought up from 15 to 20 bushels to the acre to 60 and 85 bushels by deep ploughing, without the use of any fertiliser whatever.—A. H. PERRY."

To advise a farmer to prepare a solution of ammonia gas with which to fertilise his crop is as culpable as it is ridiculous.

The ammonia from such a solution would soon be largely dissipated, and therefore would never come in contact with the plants. The solution of ammonia is very unstable and all the gas will be entirely given off even at a low temperature.

All the expense of obtaining this ammonia from the salt (salammoniac) in which it was originally combined is, moreover, absolutely wasted, since, if the salammoniac is dissolved in water and applied to the ground, the plant would be able to obtain the ammonia from the solution with readiness.

The plant does not require to have the ammonia in a free state, but salts of ammonia (notably the sulphate) will give the growing plant all that it needs without all the absurd paraphernalia and process recommended in the above quoted article.

Ammonia salts, of course, owe their value to the nitrogen which they contain, and there are other nitrogenous manures which may be used to the same end.

Farmers, however, would do well to have a preliminary examination made of their soils to learn whether nitrogenous manures are required before using any of these fertilisers, as they are a very expensive class of manure.

While chemical analysis of soils cannot do everything, it can in most cases indicate the class of manure most likely to be of benefit, and a farmer would therefore, by having his soils analysed in the first instance, often save himself from buying phosphatic manures when potash is probably needed, or potash manures when the land requires nitrogen.

In any case, it is a pretty safe conclusion for a farmer to come to that he cannot make chemical manures himself cheaper than he can buy them.

REPORT ON WHEATS, OATS, BARLEY, AND RYE, STATE FARM, HAMEL.

By G. F. BERTHOUD.

Appended is a detailed report on the varieties of grain sown on trial plots at the State farm at Hamel, for the season 1904-5 :—

WHEAT.

The varieties of wheats noted below were, with a few exceptions, grown fom seed imported from Europe and America. The local, or other Australian grown seed, gave the best results. Some of the most promising kinds have been carefully selected for further trial and early sowing during the coming season. All the plots were sown on old land, which was deeply tilled and manured with superphosphates applied in the drills when sowing the seed, at the rate of two cwts. per acre.

Nearly all varieties were diseased and damaged by the excess of rain which fell during the sowing season and the early spring months. Taken as a whole, the results are very poor and below the average of former seasons. The yields are computed by weighing the net result in clean seed from 66 feet of average drill on each plot.

White Pearl (Garton's).—Sown 16th June; germination weak and uneven; growth slow; foliage, heavy deep bluish green; straw of fair quality; height to three feet; ears of good form, beardless; harvested 18th January. Yield very light; rate of five and a-half bushels per acre; grain, white, plump; late variety.

Massy's Hybrid.—Sown 16th June; germination fairly even; growth slow and patchy; straw of fair quality; height to three feet; ears of nice shape, beardless; harvested 18th January. Yield: poor, rate of seven bushels per acre. Grain red, slightly pinched; midseason variety.

Eley's.—Sown 16th June; germination good; growth poor and uneven; foliage very narrow, dark bluish green; fine straw; height two feet six inches; ears thin and beardless; harvested 18th January. Yield: light, rate of 7¼ bushels per acre. Grain yellow, medium size, and pinched. Late, not a desirable variety.

Paros.—Sown 16th June; growth vigorous; stands up nicely; strong straw; height to four feet six inches; ears of fair size, heavily bearded, and well filled; harvested 18th January. Yield: fair rate of 12¼ bushels per acre. Grain amber, large, even size. Second early hardy; Greek variety.

Paine's Defiance.—Sown 18th June; growth healthy and fairly even; foliage wide and heavy; straw of fair quality; height to four the gas, and, as a result, we have a barrel of one of the finest fertilisers known to science. The cost is but a trifle, and it may be prepared in any quantity on any farm. When this ammonia water, further diluted, is poured about the roots of plants, it produces a phenomenal growth. But now if we analyse a grain of corn produced in this way we do not find ammonia. That develops during the slow process of decay.

"VALUE OF MANURE.

"It is to ammonia and nitrogen that stable manure owes its value. But as a factor itself in successful farming, the plough itself, run deep, stands pre-eminently at the head. Good advice is this, 'Plough deep while sluggards sleep, and you'll have corn to sell and keep,' is the best maxim ever laid down for farmers. I have seen the yield on two farms, reputably poor, brought up from 15 to 20 bushels to the acre to 60 and 85 bushels by deep ploughing, without the use of any fertiliser whatever.—A. H. PERRY."

To advise a farmer to prepare a solution of ammonia gas with which to fertilise his crop is as culpable as it is ridiculous.

The ammonia from such a solution would soon be largely dissipated, and therefore would never come in contact with the plants. The solution of ammonia is very unstable and all the gas will be entirely given off even at a low temperature.

All the expense of obtaining this ammonia from the salt (salammoniac) in which it was originally combined is, moreover, absolutely wasted, since, if the salammoniac is dissolved in water and applied to the ground, the plant would be able to obtain the ammonia from the solution with readiness.

The plant does not require to have the ammonia in a free state, but salts of ammonia (notably the sulphate) will give the growing plant all that it needs without all the absurd paraphernalia and process recommended in the above quoted article.

Ammonia salts, of course, owe their value to the nitrogen which they contain, and there are other nitrogenous manures which may be used to the same end.

Farmers, however, would do well to have a preliminary examination made of their soils to learn whether nitrogenous manures are required before using any of these fertilisers, as they are a very expensive class of manure.

While chemical analysis of soils cannot do everything, it can in most cases indicate the class of manure most likely to be of benefit, and a farmer would therefore, by having his soils analysed in the first instance, often save himself from buying phosphatic manures when potash is probably needed, or potash manures when the land requires nitrogen.

In any case, it is a pretty safe conclusion for a farmer to come to that he cannot make chemical manures himself cheaper than he can buy them.

REPORT ON WHEATS, OATS, BARLEY, AND RYE, STATE FARM, HAMEL.

By G. F. Berthoud.

Appended is a detailed report on the varieties of grain sown on trial plots at the State farm at Hamel, for the season 1904-5:—

Wheat.

The varieties of wheats noted below were, with a few exceptions, grown from seed imported from Europe and America. The local, or other Australian grown seed, gave the best results. Some of the most promising kinds have been carefully selected for further trial and early sowing during the coming season. All the plots were sown on old land, which was deeply tilled and manured with superphosphates applied in the drills when sowing the seed, at the rate of two cwts. per acre.

Nearly all varieties were diseased and damaged by the excess of rain which fell during the sowing season and the early spring months. Taken as a whole, the results are very poor and below the average of former seasons. The yields are computed by weighing the net result in clean seed from 66 feet of average drill on each plot.

White Pearl (Garton's).—Sown 16th June; germination weak and uneven; growth slow; foliage, heavy deep bluish green; straw of fair quality; height to three feet; ears of good form, beardless; harvested 18th January. Yield very light; rate of five and a-half bushels per acre; grain, white, plump; late variety.

Massy's Hybrid.—Sown 16th June; germination fairly even; growth slow and patchy; straw of fair quality; height to three feet; ears of nice shape, beardless; harvested 18th January. Yield: poor, rate of seven bushels per acre. Grain red, slightly pinched; midseason variety.

Eley's.—Sown 16th June; germination good; growth poor and uneven; foliage very narrow, dark bluish green; fine straw; height two feet six inches; ears thin and beardless; harvested 18th January. Yield: light, rate of 7¼ bushels per acre. Grain yellow, medium size, and pinched. Late, not a desirable variety.

Paros.—Sown 16th June; growth vigorous; stands up nicely; strong straw; height to four feet six inches; ears of fair size, heavily bearded, and well filled; harvested 18th January. Yield: fair rate of 12¼ bushels per acre. Grain amber, large, even size. Second early hardy; Greek variety.

Paine's Defiance.—Sown 18th June; growth healthy and fairly even; foliage wide and heavy; straw of fair quality; height to four feet; ears long, well filled, and heavily bearded; harvested 18th January. Yield: fair rate of 11 bushels per acre. Grain red, small, and plump; midseason variety.

Suli.—Sown 18th June; growth slow but healthy; foliage narrow, dark green; stools out well; good straw; height three feet six inches; ears long and thin; harvested 18th January. Yield: rate of 10 bushels per acre. Grain red, small; midseason variety.

Imogger.—Sown 20th June; growth slow .and uneven; height to two feet six inches; harvested 18th January. Yield: poor, rate of five bushels per acre. Grain deep yellow, small. Late variety.

Fenton.—Sown 20th June; growth patchy; height to two feet six inches; harvested 18th January. Yield: light, rate of five bushels per acre. Grain red, small. Late and poor variety.

Marenil.—Sown 20th June; growth slow and uneven; foliage wide; fair straw; height two feet six inches; harvested 18th January. Yield: very poor. Grain red, pinched. Late variety, not desirable.

Volunteer.—Sown 20th June; growth slow; height to three feet; ears small and bearded; harvested 18th January. Yield: very poor, rate of $4\frac{1}{4}$ bushels per acre. Late, not desirable.

Barts King.—Sown 20th June; growth healthy and fairly even, flag heavy, ears long and bearded, some heads smutty; height to three feet; harvested 18th January. Yield: light, rate of $4\frac{3}{4}$ bushels per acre. Grain red, large and plump. Not desirable for this locality.

Sandomir.—Sown 20th June; growth slow, foliage narrow; height two feet six inches; ears long, thin and beardless; harvested 18th January. Yield: very light. Grain red, small and pinched. Late and poor variety.

Nonette de Lausanne.—Sown 20th June; growth healthy and strong; foliage wide, strong straw; height to four feet; ears large and well-filled, heavy bearded. Harvested 18th January. Yield: rate of $7\frac{1}{4}$ bushels per acre. Grain red, pinched. Latest variety.

Manhattan.—Sown 21st June; growth slow and uneven; foliage narrow, deep bluish green; height two feet long; ears long and thin. Harvested 18th January. Yield: very light, rate of four bushels per acre; grain pale red, small. Late, not desirable.

Spalding's Prolific.—Sown 22nd June; growth very uneven; height to three feet; ears long and thin. Harvested 19th January: Yield: light, rate of six bushels per acre. Late, and poor variety.

Candeal.—Sown 22nd June; growth uneven; height to four feet; ears short and thick, heavily bearded; chaff and beards dark brown. Harvested 18th January. Yield: rate of nine bushels per acre. Grain hard and flinty. Not a desirable sort.

Rusca Nera.—Sown 22nd June; growth strong and healthy; foliage wide; straw stiff, stools well; height to four feet six inches;

ears long, well filled and heavily bearded. Harvested 18th January. Yield: fair rate of 11½ bushels per acre. Grain red, heavy and plump, should be a useful poultry wheat. Late variety.

New Era, Garton's.—Sown 22nd June; germination very poor, about one-half of the seed failed to come up; growth fairly healthy; foliage wide and heavy, may be liable to rust; stools out well; straw strong; height to 3 feet 9 inches; ears long-bearded and loosely filled; harvested 18th January. Yield: light, rate of eight bushels per acre. Grain red, large, and fairly plump. Late variety.

Torentino.—Sown 22nd June; growth slow; slender straw; height up to four feet: ears short and heavily bearded; harvested 18th January. Yield: light, rate of 7½ bushels per acre. Grain amber, large, and flinty. Second early; not a desirable sort.

Pringle's Defiance.—Sown 22nd June; growth good, stools out nicely; foliage, medium wide pale-green; height four feet; ears long and thin; harvested 18th January. Yield: at the rate of 11¼ bushels per acre. Grain pale amber, medium size, and plump. Fair late variety.

Italian Summer.—Sown 23rd June; growth fairly even; straw rather weak; height to 4 feet 6 inches; ears well filled; heavily bearded; harvested 18th January. Yield: fair, at the rate of 10 bushels per acre. Grain white, large, and plump; good for poultry feeding. Second early; fair variety of its class.

Atlanti.—Sown 23rd June; growth fair, height to four feet; straw rather weak, liable to fall over; ears of good size, heavily bearded; harvested 18th January. Yield: at the rate of 10 bushels per acre. Grain, amber, large and flinty. Second early; fair variety in this class.

Madonna.—Sown 23rd June; growth uneven owing to wet soil; straw weak, falls over badly, height to four feet; ears short and thick, well filled; chaff and beards dark brown; harvested 18th January. Yield: at rate of nine bushels per acre. Grain amber, of fair size. Second early.

Kaiser.—Sown 23rd June; growth very slow and poor; height to two feet six inches; ears long and thin; harvested 18th January. Yield: light, at rate of five bushels per acre. Grain small and pinched. Late, not desirable.

Kubanka.—Sown 23rd June; growth fairly even; height to four feet; straw of fair strength; ears long, well filled, and heavily bearded; harvested 18th January. Yield: fair, at the rate of 10 bushels per acre. Grain amber, large, and hard. Second early; said to be the best of the Macaroni varieties.

Romanella.—Sown 24th June; germination slow and weak; growth very uneven; height to two feet six inches; ears small and beardless; harvested 18th January. Yield: light, at the rate of 6¼ bushels per acre. Grain red, fair size. Late, not desirable.

Red Naples.—Sown 24th June; growth poor and uneven; height to three feet; stands up well; ears long and beardless. Harvested 18th January. Yield: light, rate of 5½ bushels per acre. Grain red, fair size. Late, not desirable.

Kolben.—Sown 24th June; growth very slow and uneven; height to two feet; ears small. Yield: light, rate of six bushels per acre. Grain red, small. Late, not desirable.

Zealand White.—Sown 24th June; growth poor; stools well; foliage medium, wide; straw of good quality; height to two feet six inches; ears long and thin. Harvested 18th January. Yield: light, rate of 6¼ bushels per acre. Grain white, large and plump.

Neapel.—Sown 24th June; growth fairly even; height to three feet; straw stands up well; ears long and well filled; heavily bearded. Harvested 18th January. Yield: rate of 8½ bushels per acre. Grain red, medium size. Second early.

Noe.—Sown 27th June; growth slow, but even; foliage deep bluish green; good straw; height to three feet. Harvested 18th January; ears of fair size, well filled. Yield: rate of 7¼ bushels per acre. Grain red, plump. Late, not desirable.

Roggen.—Sown 27th June; growth very slow and poor; height to two feet; ears thin and beardless. Harvested 18th January. Yield: light, at the rate of five bushels per acre. Grain red, small. Late, not desirable.

St. Laud.—Sown 28th June; germination bad; growth slow and sickly; height to two feet; ears small and beardless; harvested 18th January. Yield: light, rate of five bushels per acre. Grain red, small and pinched. Late; not desirable.

Saumur de Mars.—Sown 28th June; growth poor and sickly; height to three feet; ears thin and beardless; harvested 18th January. Yield: light, rate of seven bushels per acre. Grain red, small and plump. Not a desirable variety.

Horsford's Pearl.—Sown 28th June; growth sickly; height to two feet six inches; harvested 18th January. Yield: poor, rate of five bushels per acre. Grain pale red, small, and pinched. Late, not desirable.

Poland.—Sown 28th June; growth poor; height to three feet six inches; ears long, loose set and bearded; straw weak, more like rye than wheat in general appearance; harvested 18th January. Yield very light. Grain amber, long and flinty. Second early; not desirable.

Sleaford.—Sown 28th June; growth uneven and sickly; height to three feet; straw weak; ears medium size and beardless; harvested 18th January. Yield: light, rate of 6¼ bushels per acre. Grain amber, hard; not desirable.

Pringle's Champlain.—Sown 28th June; growth uneven; height to three feet; ears small and bearded; harvested 18th January. Yield: rate of eight bushels per acre. Late variety; not desirable.

Californian March.—Sown 29th June; grows fair; straw slim and weak; height to three feet; ears small and beardless; harvested 18th January. Yield: rate of 7¼ bushels per acre. Grain red, small, and pinched; late and poor.

North Allerton.—Sown 29th June; growth very slow; height two feet; harvested 18th January. Yield: very poor, rate of five bushels per acre. Grain deep yellow, small and pinched; late and poor variety.

Johnson.—Sown 28th June; growth very patchy; height to three feet; harvested 18th January. Yield: light, rate of seven bushels per acre. Grain white, fair size.

Medeah.—Sown 29th June; growth strong and healthy; straw good, stands well, does not stool much; height three feet six inches; ears large, bearded, and well filled; harvested 18th January. Yield: rate of 8¾ bushels per acre. Grain amber, hard, and flinty; fair second early in this class.

Andros Summer.—Sown 29th June; growth uneven; slender straw; height to three feet; ears medium size and heavily bearded; harvested 18th January. Yield: light, rate of 6¼ bushels per acre. Grain red, long berry; main crop variety.

Egyptian.—Sown 29th June; growth sickly, owing to wet soil; height to three feet; ears large, with several smaller ones around the base of the main one, bearded; harvested 18th January. Yield: light, rate of 6¼ bushels per acre. Grain red; late and poor variety.

Taganrogg.—Sown 29th June; growth poor and uneven; foliage, wide, bluish green; height to three feet six inches; ears medium size and heavily bearded; harvested 19th January. Yield: rate of nine bushels per acre. Grain pale red and plump. Late variety.

White King.—Sown 30th June; growth poor and uneven; height to two feet six inches; ears short and thick; harvested 19th January. Yield: light, rate of 7½ bushels per acre. Grain white and plump. Late variety.

Petanielle de Nice.—Sown 30th June; growth very patchy; height to three feet six inches; ears long and heavily bearded; harvested 19th January. Yield: rate of 8¼ bushels per acre. Grain red, even size, and plump. Late variety.

Grannen's Hybrid.—Sown 30th June; growth fairly even; height to three feet six inches; straw stiff, stands up well; ears short, with square tips; harvested 19th January. Yield: light, rate of five bushels per acre. Grain red and plump. Late and very distinct variety.

Persian.—Sown 30th June; growth fair; habit dwarf and distinct; height to two feet six inches; straw slender, stands up fairly well; ears long and thin; chaff and beards dark brown; harvested 19th January. Yield: light, rate of five bushels per acre. Grain dull red, thin and poor. Second early.

Russian.—Sown 30th June; growth slow and weak; straw slender, height to 2 feet 6 inches, ears small and bearded; harvested 19th January. Yield: light, rate of 7¼ bushels per acre. Grains red, small, and pinched. Poor and unsuitable variety.

Oxford Prize.—Sown 1st July; growth very uneven; height to two feet; harvested 19th January. Yield: poor, rate of five bushels per acre. Grains deep, yellow, small. Late and poor variety.

Centennial.—Local selected seed, sown 1st July; growth vigorous and fine, plants of this sort do not stool out much; height four feet, fairly level; ears large, well filled and bearded; harvested 19th January. Yield: fair, rate of 10 bushels per acre. Grain large, white, soft and plump. Main crop; good variety for poultry feeding.

Farrer's 40/c.—Local seed, sown 13th July; growth very weak, owing to wet soil; height to two feet six inches; ears small and beardless; harvested 23rd January. Yield: very light. Grain white, pinched and poor. This variety is not suitable for culture here.

Ranjit.—Local seed selected from early plants, sown 13th July; growth uneven owing to wet land; straw weak; height to three feet six inches, ears of fair size, beardless; harvested 23rd January. Yield: light, rate of nine bushels per acre. Grain white, large, and plump. Not suitable for this locality.

Frankenstein.—Sown 14th July; growth slow and uneven; height to two feet; harvested 23rd January. Yield: light, rate of 6¼ bushels per acre. Grain yellow, medium size. Very late, not desirable.

Golden Auc.—Sown 14th July; growth dwarf and patchy; height to two feet three inches; harvested 23rd January. Yield: light, rate of 6½ bushels per acre. Grain deep yellow, small. Very late and poor variety.

Bastard.—Sown 14th July; growth slow, but even; foliage bluish green; stools fairly well; height to three feet; ears short, bearded, and well filled; harvested 23rd January. Yield: good, rate of 12 bushels per acre. Grain red, plump, and very even in size. Late variety, good for poultry feeding.

Italian White.—Local selected seed, sown 13th July; growth good; foliage pale green; fair straw; height three feet, level; ears beardless, of nice shape and well filled; harvested 23rd January. Yield: good, rate of 15 bushels per acre. Grain white, medium size. Fair second early variety.

Hopetoun.—Sown 13th July; growth very slow and uneven; height to two feet six inches; harvested 23rd January. Yield very light. Grain small, deep yellow. Late and unsuitable.

Farrer's 53 A (crossbred from Tardent's Blue).—Local selected seed; sown 13th July; growth even; colour, deep bluish green; straw clean, of good quality; height three feet six inches; level and neat; ears of fair size; beardless velvety chaff; harvested 23rd January. Yield: good, rate of 21¼ bushels per acre. Grain white, large, and even. First-class new main-crop variety suitable for growth in the South-West. If sown early should be a superior hay wheat.

Bobs, Farrer.—Seed of Mr. Farrer's own selection; sown 13th July; growth healthy, level and good; height four feet; straw clean and of good quality; ears of fair size, beardless; hold grain well; harvested 23rd January. Yield rate of 17¼ bushels per acre; grain white, plump, of fine milling quality. Second early variety.

John Brown.—Selected seed from Mr. Farrer; sown 13th July; growth healthy and good; height four feet, level; clean straw of fine quality; ears of fair size, beardless; holds grain well; brown chaff; harvested 23rd January. Yield, rate of 17 bushels per acre; grain white, plump, and even size; superior milling quality. Good second early variety.

Cumberland.—Selected seed from Mr. Farrer; sown 13th July; growth quick and strong; straw of fair quality, stands up well; height three feet; level and neat; ears of good shape and size, well filled, holds grain well; harvested 23rd January. Yield very good; rate of 20 bushels per acre; grain white and plump. Good new early wheat, an improvement on Steinwedel.

Dividend.—Sown 13th July; growth slow but healthy; foliage deep blue green; straw fair, stands up well: height two feet six inches; even ears, long and thin; harvested 23rd January. Yield fair, 11¼ per acre; grain red, medium size. Late variety.

White Chiddam.—Sown 13th July; growth slow and uneven; height to two feet: harvested 23rd January. Yield light, rate of 7½ bushels per acre. Grain white, pinched. Late variety not desirable.

White Flanders.—Sown 13th July; growth slow and uneven; straw rusty; harvested 23rd January. Yield very light; grain white, badly pinched. Late variety, poor.

Carman's No. 1.- Sown 13th July; growth, fairly healthy and strong; good straw; height to two feet six inches; ears well filled, bearded; harvested 23rd January. Yield: fair, rate of 12½ bushels per acre. Grain, red. Late variety.

Allph.—Sown 12th July; growth, poor; straw weak and rusty; harvested 23rd January. Yield, very light. Grain small and badly pinched. Late variety, not desirable.

Golden Drop.—Sown 12th July; growth, slow and weak; height to two feet; harvested 23rd January. Yield: light, rate of six bushels per acre. Grain deep yellow, and small. Late and poor variety.

Russian Summer.—Sown 12th July; growth, vigorous and healthy; foliage, deep bluish green, fair straw; ear of good size, heavily bearded; harvested 23rd January. Yield: fair, rate of 11 bushels per acre. Grain, amber. Large, second early.

NOTE.—All the previously named wheats were sown too late to give them a fair trial. Of the imported varieties, the bearded ones stood the wet and unfavourable season better than the others. Several of these, if sown earlier, should prove to be prolific and useful for poultry feeding, and in the cool districts.

Wheats, Block 8.—The varieties noted below were grown on larger plots; soil: low lands of fair quality, ploughed to the depth of six inches, and laid out in narrow lands 22 feet wide, with water furrows between each, all leading into the main drain at the lower end of the block. The soil at the date of sowing was very wet and boggy. This crop was the second grown on this field, sown broadcast, at the rate of 60lbs. of seed per acre. Manure: consisting of equal parts of bone-dust and superphosphates, mixed and sown with the seed at the rate of 2cwt. per acre. The yields, owing to the wet season, are, on the whole, poor and unsatisfactory. The early wheat Alpha gave the best results in the early class, Plover in the main crop milling varieties, and Galland's Hybrid in the late bearded wheats.

Toby's Luck.—Sown 13th June; growth quick and fairly healthy; straw rather weak; height to three feet; patchy owing to wet; ripe early, 29th November; ears of fair size, beardless, holds grain very well. Yield: light, rate of 6½ bushels per acre. Grain large, of good quality. Not suitable for culture here, but should be a useful wheat for trial in dry districts; fair early variety.

Crossbred No. 73.—Sown 13th June; growth uneven, owing to wet soil; height to three feet; ears of fair size; well filled; holds grain well. Yield: at the rate of nine bushels per acre. Fair early variety; ripe end of November; suitable for dry districts.

White Lammas.—Sown 8th July; growth fairly good; rather patchy, owing to excess of wet; height to four feet; straw clean and good, ears of fair size; well filled; shells grain when dead ripe. Yield: rate of 9½ bushels per acre. Grain white, large, of good milling quality. Second early; useful for hay or grain.

Galland's Hybrid.—Sown 8th July; growth slow, but healthy straw strong; does not stool much; height, three to four feet; ears large; bearded; holds grain well; ripe third week in December. Yield: rate of 10½ bushels per acre. Good variety to grow for poultry feeding. Grain large, white and soft. Distinct late variety, which should be sown early in May.

Tardent's Blue.—Sown 8th July; growth slow and uneven; foliage, rich bluish green; straw clean and good; height three to four feet; ears long; chaff velvety; holds grain well; will shell a little in rough weather, when fully ripe. Yield: rate of nine bushels per acre. Late variety; good for hay or grain.

Lucky Talavera.—Sown 9th July; growth, fair, healthy; good straw, stands up well; height three to four feet; ears of good size, beardless, holds grain well. Yield: rate of 10 bushels per acre. Grain red, good milling quality. Main crop variety, useful for grain or hay in the South-Western Districts.

Plover.—Sown 9th July; growth fairly good and healthy; height to three feet; ears beardless, of good size, well filled, holds grain well. Yield: rate of 10½ bushels per acre. Grain white, plump, and good. Main crop variety.

Crossbred No. 100.—Sown 9th July; growth fair but patchy owing to wet soil; height to three feet; good straw; ears beardless, rather small. Yield: rate of 9¼ bushels per acre. Grain white; fair second early variety.

Alpha.—Sown 9th July; soil very boggy; growth quick and healthy; stands up well; fair straw; height three to four feet; ears of fair size, beardless, holds grain well; ripe 10th December. Yield: rate of 11 bushels per acre. Good early variety for dry districts.

Crossbred 1/J (early).—Sown 20th July; growth quick and fairly healthy; straw rather weak; height to three feet six inches; ears beardless, holds grain well; harvested first week in December: Yield: rate of eight bushels per acre. Should be suitable for trial in dry districts; here the long periods of rain damage it greatly.

Berraf.—Sown 20th July, growth uneven; height to three feet; straw fine, but fairly strong, clean and not liable to rust; ears rather small, beardless; ripe first week in December. Yield: light, rate of seven bushels per acre. Early variety, suitable for drier climate.

OATS.

Soil and manuring same as on the wheat plots. Most of the kinds named below were grown from imported seed. The local-saved seed gave the best returns. All were more or less damaged by wet soil, therefore the test was not a fair one. Under better conditions several of the varieties would give good results. The best have been selected for trial during the coming season. Yields of nearly all the sorts are very poor, and the samples of grain light and thin.

Burt (American variety).—Sown 2nd July; growth free and fairly healthy; straw medium size, of good quality, heads wide and spreading; height three to four feet; ripe early 25th November. Yield: fair, rate of 14½ bushels per acre; grain white, rather light and thin. I consider that this oat will prove to be a very good one for the dry districts.

Funk's Early Champion (American seed).—Sown 2nd July; growth rather weak and uneven; straw slender; height to three feet, heads spreading; ripe 1st December. Yield: light, rate of 11 bushels per acre. Grain white, small, and thin. Early variety.

Red Mortagne.—Sown 2nd July; growth slow; foliage badly diseased; height two feet six inches; very patchy and late, heads spreading. Yield: light, rate of eight bushels per acre. Grain reddish brown, light and thin. Late variety.

Mesdaq.—Sown 3rd July; growth poor and weak; height to two feet six inches. Yield: light, rate of nine bushels per acre. Grain black, medium size, and light. Second early variety.

Clydesdale.—Sown 6th July; growth uneven; height to three feet; straw coarse, heads spreading. Yield: poor, rate of 7½ bushels per acre. Grain white. Late variety.

Dollar.—Sown 6th July; growth fair; straw coarse; heads long with grain on side; height three feet six inches. Yield: fair, rate of 12½ bushels per acre. Grain white, short and plump, good feeding quality. Late variety.

Rispen's Yellow.—Sown 6th July; growth uneven; height to three feet six inches; heads spreading. Yield: light, rate of 10 bushels per acre. Grain pale yellow; long and thin. Late variety.

Probsteier.—Sown 6th July; growth uneven; height to three feet six inches; straw fairly good, heads spreading. Yield: rate of 11¼ bushels per acre. Grain white, long and bearded. Late and poor variety.

Funk's Great Dakota.—Sown 6th July; growth fairly even; straw of good quality, not coarse; height to three feet six inches; heads wide and spreading. Yield: fair, rate of 13½ bushels per acre. Grain white. Midseason variety.

California Prolific.—Sown 6th July; growth slow but fairly even; height to three feet; heads of nice even shape, with grain on side. Yield: rate of 10 bushels per acre. Grain white, small and thin. Late variety.

Longfellow.—Sown 6th July; growth slow and poor; height to three feet; straw coarse, heads spreading. Yield: rate of 10 bushels per acre. Grain white, thin and bearded. Poor late variety.

Providence.—Sown 7th July; growth patchy, straw good, dwarf habit; height two feet six inches; heads spreading. Yield: rate of 10 bushels per acre. Grain white, small and thin. Late variety.

Falman's White.—Sown 7th July; growth slow but fairly healthy; straw coarse; height to three feet; heads of good size with grain on side. Yield: fair, rate of 13 bushels per acre. Grain white, short, and plump. Good for feeding. Late variety.

Anderbeoner.—Sown 7th July; growth slow and uneven; dwarf habit; height two feet six inches; heads spreading. Yield: poor, rate of eight bushels per acre. Grain white. Late variety.

Leutenitzer.—Sown 7th July; growth slow; height two feet six inches; heads spreading; small and smutty. Yield: poor, rate of eight bushels per acre. Grain yellow, thin, and bearded. Poor and late variety.

Georgia White.—Sown 8th July; growth very uneven; straw fine; of dwarf habit; height to two feet six inches; heads spreading. Yield: poor, rate of nine bushels per acre. Grain white, long and thin. Late variety.

Bestehorns.—Sown 8th July; growth poor; straw coarse; height to two feet six inches; heads spreading; some smutty. Yield: rate of 11¼ bushels. Grain white, thin, and bearded. Late variety.

Pied de Mouche.—Sown 8th July; growth slow but even and healthy; straw slender, stands up fairly well; colour deep bluish-green; height to three feet six inches, suitable for cutting as green feed; heads spreading. Yield light. Grain grey, very small, and bearded. Hardy and distinct.

Rugenscher.—Sown 8th July; growth slow and poor; straw coarse and liable to break down; height to two feet six inches; heads spreading; shells grain easily. Yield: light, rate of nine bushels per acre. Grain white, thin, and bearded. Late variety.

August.—Sown 8th July; growth poor and patchy. Yield: light, rate of eight bushels per acre. Grain yellow, long, and thin. Late variety.

Gebirgs.—Sown 8th July; growth slow and uneven; height to two feet six inches; straw coarse; heads spreading, some smutty. Yield: rate of 10½ bushels per acre. Grain white, fairly plump. Late variety.

Nassengrunder.—Sown 12th July; growth poor; straw coarse; height to three feet; heads spreading. Yield: light, rate of eight bushels per acre. Grain white, long, and bearded. Late variety.

Hilton.—Sown 13th July; growth slow; straw course; height to two feet six inches; heads spreading. Yield: light, rate of 10 bushels per acre. Grain white, fairly plump. Late variety.

Italian.—Sown 12th July; growth slow, but fairly even and healthy; foliage wide; straw rather coarse; height three feet; heads small and spreading. Yield: fair, rate of 13 bushels per acre. Grain white, short and plump; good for poultry feeding. Late variety.

Early Ripe (Local seed).—Sown 12th July; growth quick and fairly even; straw of good quality; height three feet six inches; heads spreading, holds grain well. Yield: good, rate of 18 bushels per acre. Grain very pale brown, fairly plump. Good early variety.

Pioneer, Garton's (English seed).—Sown 29th June; growth slow; straw rather coarse, but of good quality; height three feet; heads spreading and fairly well filled. Yield: light, rate of 12½ bushels per acre. Grain brown, plump, and good. Late variety.

Storm King, Garton's (English seed).—Sown 30th June; growth slow and uneven; height from two to four feet; straw stiff, stands up well; heads of fair size; grain on side. Yield: light, rate of 11 bushels per acre. Grain white, short and plump, very good for feeding. Should, under favourable conditions, prove to be a very good late variety.

Excelsior, Garton's (English seed).—Sown 1st July; growth slow and poor; height two to three feet; heads fairly well filled; grain on side. Yield: rate of 12½ bushels per acre. Grain dark brown, short and plump. Fair late variety.

Danish Island.—Sown 6th July; growth poor and uneven; straw coarse, two to three feet; heads spreading; shells grain easily. Yield: rate of 10 bushels per acre; grain yellowish white, thin and bearded. Late variety.

Golden Fleece.—Sown 9th July; this plot very wet at time of sowing; growth fairly healthy; height to three feet; heads of fair size and spreading. Yield: fair, rate of 14 bushels per acre. Grain pale yellow, of good quality. Late variety.

White Siberian.—Sown 9th July; soil wet and boggy; growth slow and uneven; straw coarse; height to three feet six inches; heads wide and spreading. Yield: rate of 10½ bushels per acre. Grain white, of fair size and quality. Late variety.

BARLEY.

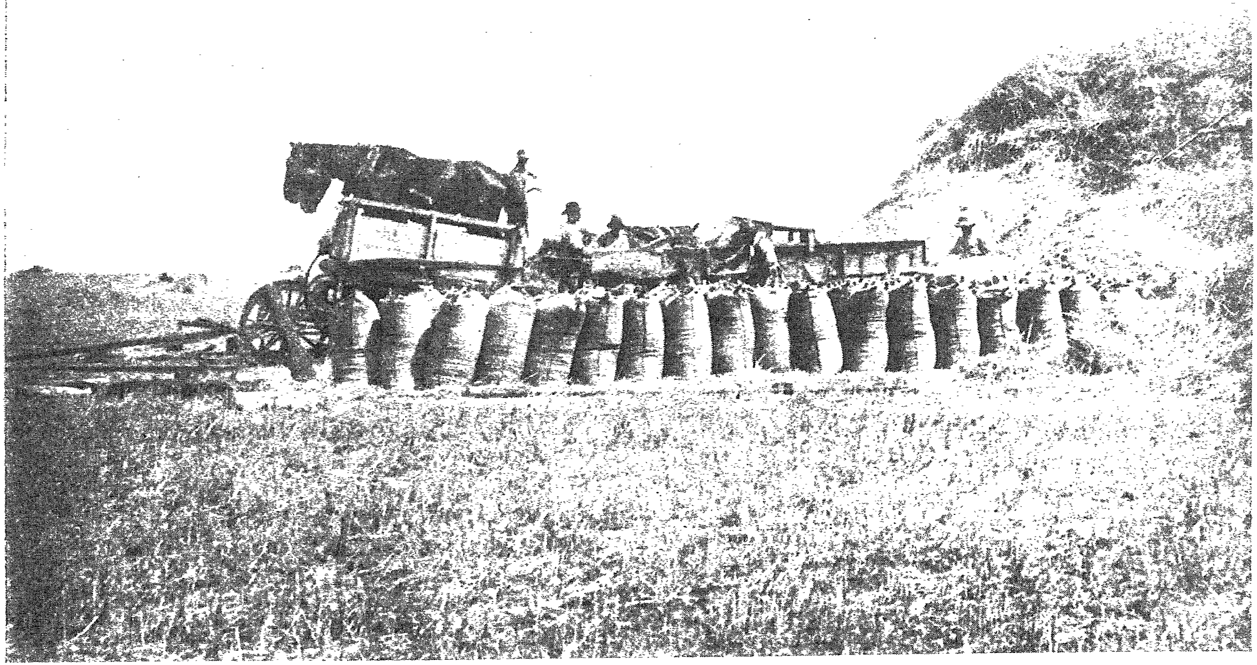
The soil on this farm does not appear to be suitable for the profitable culture of this cereal. Even in more favourable seasons the results are never very good. Soil and manuring similar to the wheat plots.

Nepaul (Hordeum æqyceras).—Sown 4th July; growth poor; plants yellow and diseased, owing to the wet weather; straw of good quality, being sweet and nutritious for green feeding; height two feet; ears of fair size and beardless; ripe 20th November. Yield: very light; grain amber colour and huskless, not unlike wheat. Should be a useful variety to grow for poultry and green feed in the dry districts.

Maltster, Garton's.—Sown 5th July; growth poor and patchy; straw fairly good; height to two feet six inches; ears of nice shape and size; grain in two rows, white, of good malting quality. Yield: light, rate of nine bushels per acre.

Invincible, Garton's.—Sown 5th July; growth fairly even; height two feet; ripe last week in November; ears of nice shape. Grain in two rows; white, of good malting quality. Yield: light, rate of 10 bushels per acre.

Lapri.—A variety of the Chevalier; imported from Chili, South America; sown 13th July; growth even and nice; height two feet; ripe end of November; ears of fair size, two rowed. Yield: rate of 11 bushels per acre. Grain white, medium size and plump. Fair variety.



Tread Power and Thresher (Side View) at the Chapman Experimental Farm.

Kaiser.—Sown 13th July: growth uneven; part of plot destroyed by wet; height to two feet. Yield light. Grain white, of good size and quality. Malting variety.

Fuli.—Sown 14th July; growth poor and uneven; height two feet; ears of fair size, two rowed. Yield: light, rate of 8 bushels per acre. Grain white. Malting variety.

Erfurt White.—Sown 14th July; growth poor; height to two feet; ears slim, two rowed. Yield: very light. Grain white; fair size. Poor variety.

Hofbrau.—Sown 14th July; growth fairly even and healthy; height to two feet six inches; ears well filled, two rowed Yield: fair, rate of 11 bushels per acre. Grain white, large. Said to be of very good malting quality. Fair early variety.

Funcel.—Sown 14th July; growth fairly even; straw good, stands up well; height two feet six inches; ears of fair size, two rowed. Yield: rate of 10 bushels per acre. Grain white, plump. Second early malting variety.

Gambrinus.—Sown 14th July; growth dwarf, even and healthy; height two feet; ripe end of November; ears two rowed and well filled. Yield: rate of 10 bushels per acre. Grain yellowish white. Fair early. Malting variety.

Zero, Garton's.—Sown 3rd July; growth fairly even; height two feet; ears of nice size, six rowed and well filled; plot badly damaged by wet; harvested 2nd December. Yield: rate of 9½ bushels per acre. Fair variety.

RYE.

Winter.—Sown 14th July; growth poor and uneven. The greater part of this plot failed to mature seed. This is a very slow-growing late variety, and one that should be sown very early; suitable for cold climate. Yield: very light. Poor variety.

Markisscher.—Sown 14th July; growth very tall and even; straw clean, of good quality, stands up well; height five feet six inches; ears long and well filled. Yield: good, rate of 18½ bushels per acre. Grain plump and good. This is one of the very best kinds of rye yet tested on these plots. Early and good.

Correns.—Sown 14th July; growth very slow and uneven; height to three feet. Yield: light, rate of nine bushels per acre. Grain small and pinched. Late and poor; not suitable for this district.

Probsteier.—Sown 14th July; growth slow and patchy; height to three feet. Yield: light, rate of eight bushels per acre. Grain small and pinched. Late and poor variety.

Banater.—Sown 14th July; growth fair, but uneven; height from two to four feet. Yield: light, rate of nine bushels per acre. Grain large and plump. Late variety.

NOTES ON THE STATE FARM, HAMEL.

By G. F. BERTHOUD.

The manager of the State farm at Hamel, reporting on the work done during the month of March, speaks very hopefully of the various experimental plots now in hand, and, in commenting thereon, says:—

Weather during the past month was hot and dry, with the exception of a few light showers. A good fall of rain soon would be very desirable, to start the growth of grass for live stock, and also to facilitate ploughing and preparing the land for seed sowing.

RICE.—The plots of this cereal are all looking well. The early Egyptian and Italian varieties are ripening and likely to give fair results.

COTTON.—The plants are now making good growth, flowering and setting pods well. The season, however, is now so far advanced that very few of the bolls are likely to mature before the heavy winter rains set in. The young plants of the two first sowings were killed by the cold and wet weather late in spring. This crop is likely to be a failure here this season.

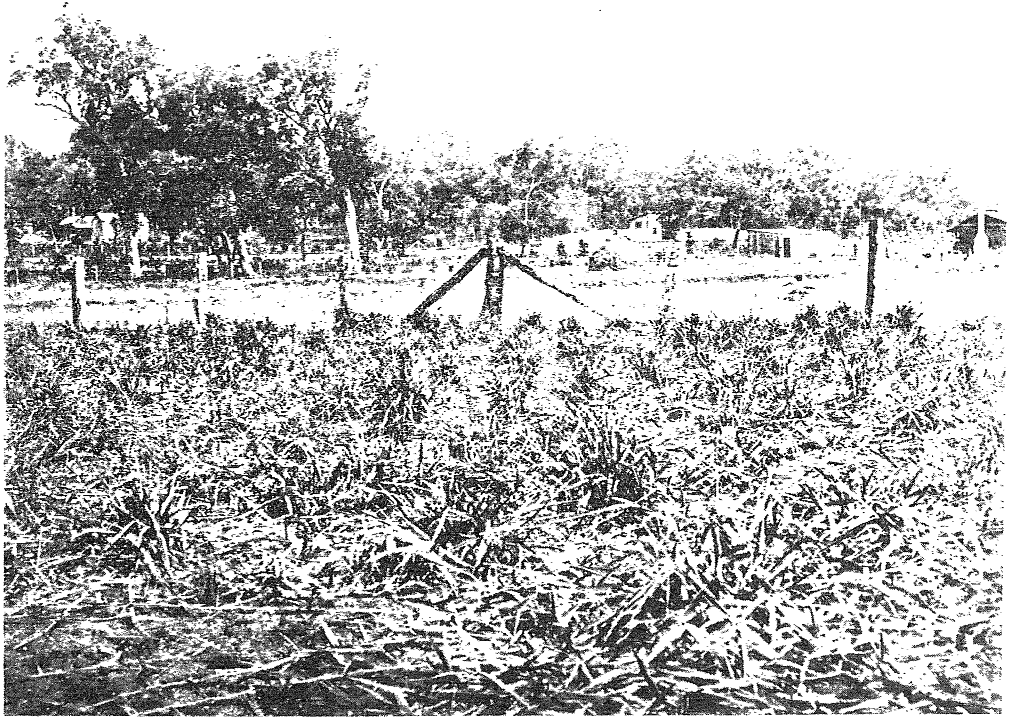
POTATOES.—The new varieties, Evergood, King Edward VII., the Factor, and Northern Star, imported from Scotland, reached here in January in splendid order, with hardly a bad tuber in the whole lot. They were planted at once on new low-lying damp land; they came up quickly, and all have made fine healthy growth, with promise of a good yield of tubers. I am of opinion that it would pay up-to-date growers to import their stock seed from Scotland. As a rule the tubers from there are very sound and free of disease.

The potato moth is very much in evidence this autumn, and will do considerable damage to the late potato crops.

MAIZE.—The plots this season include several valuable new early varieties introduced from America. Some are now ripe and fit for harvesting, with promise of good returns.

ORCHARD.—Most of the young trees have made very satisfactory progress. The apples, apricots, almonds, peaches, pears, plums, and figs have all grown vigorously, and the wood is clean and healthy. The oranges, lemons, and other varieties of fruit trees are also looking well.

GRASSES.—Some of the plots are making fair progress. The Rhodes grass (*Chloris virgato*) from South Africa is doing exceedingly well. Since sowing the seed early in November the plants have made rapid growth, and now form strong plants over two feet high. The foliage appears to be fairly tender and of good



African Wonder Grass (*Panicum Spectabile*). Four and a-half months' growth.

quality for stock feeding. The plants send out strong runners from the base, which throw out roots at the joints and form new plants; hence should be of considerable value for culture on low-lying and wet lands in summer. The seed should be sown early in spring.

WORK.—Land is now being prepared for early sowing; surface drains and other seasonable work being attended to.

SEEDS. —The past month has been a busy one for cleaning and packing the various lots of selected cereals and seeds of other plants; also the taking up, drying, and packing of the numerous kinds of bulbs and roots.

SOWING.—Several small lots of new and rare varieties of grasses and other plants have been sown under shelter for setting out in the field later on.

LIVE STOCK.—The Berkshire pigs, Indian Runner ducks, and White Wyandottes are doing well.

NARROGIN EXPERIMENTAL FARM.

By FRANK L. FAULKNER.

A very dry, dusty October, practically devoid of rain, has made it hard to do anything in the way of preparing land for seeding or to touch the fallows to advantage. Those, however, who are not fortunate enough to have fallow, and whose land is capable of being ploughed dry, should proceed with this work at once, so as to prevent the work from coming in with a rush. Land ploughed this way should not be sown dry, and, preferably, it should be left until near the end of the seeding, then either scarified or lightly ploughed and then well harrowed before sowing. Land thus prepared, although, not so good as a well-tended fallow, is infinitely superior to land just ploughed and sown. Those farmers having old-established places and plenty of cleared arable land, have only themselves to blame if all their land intended for cropping is not fallowed and scarified with a very light ploughing and made ready for drilling.

By this time farmers, graziers, and owners of flocks of ewes or a dairy herd should have a good area of their stubble land lightly ploughed or scarified ready for sowing rape, kale, etc., for early green feed. Rape, which is, I think, most suited to the conditions, can be merely broadcasted on such land, 8lbs. or 10lbs. per acre, and the land well harrowed. It is preferable, however, to drill in the seed, 4lbs. to 6lbs. per acre, and 14 inches to 16 inches in the rows. Rape thus sown will give almost the earliest possible crop of fodder, and it will continue good until Christmas.

A few acres of White Mustard, mixed with Barley, on well-manured land, will give a good early crop, but it does not last like rape.

Kale, drilled in rows of two feet to three feet apart, about midwinter, will give a bulky crop of fodder that will keep good almost all the summer.

When starting the seeding, the first land sown should generally be the proposed hay crop. A good, fine, bulky strawed wheat should be selected and the sowing should be thick, at least one bushel and a-quarter to the acre. A thickly-sown crop gives a heavy crop, also a fine quality hay. When sowing for wheat, while the season is early, the sowing should be thinner. The late maturing, heavy-tillered varieties should be sown first, in quantities up to three-quarters of a bushel per acre. As the season progresses, maturing varieties should be used, and as these varieties never tiller like the slowly-maturing wheats, the seeding should be thickened gradually up to one and a-half bushels per acre. All seed intended for grain should be pickled with bluestone or formalin solutions before sowing, and in place of the old-fashioned turning and sprinkling method, the grain should be thoroughly immersed, bag and all, into a solution of either of the above-named chemicals.

For barley and oats, in which the Powder Smut is generally the most trouble, the hot-water pickling is found to be the most effective.

Those farmers ploughing their lands to be sown almost immediately, should not make the mistake of ploughing too deeply. Three and a-half inches is ample on any soil, and more attention should be paid to obtaining a good tilth and a firm bottom. Scarify and harrow as much as possible after ploughing. Land that has been ploughed deeply is always better for wheat if it is allowed to lie as fallow for several months and to have undergone a series of scarifying and harrowing.

NOTES ON THE EXPERIMENTAL FARM, NARROGIN.

By FRANK L. FAULKNER.

I herewith beg to submit the report of the farm for February, 1905:—

The past month has been seasonable and dry, only three points of rain being recorded. The result is that feed, fields, and roads are alike, dusty and dry. Work has not taken very much seeking during the month, in spite of the harvesting being all completed. The chief work done was poison grubbing, wheat and seed grading, preparing land for burning, stone and stump picking, ploughing, and carting stone, sand, timber, etc., to the new dairy in course of erection. The poison keeps us continually on the alert. Even in the cultivated paddocks, seedlings of both York road and box are very numerous. A few sheep and goats have succumbed to its effects during the month.

The wheat grading is a slow, unsatisfactory process with the machine at our disposal. A good deal has been done, but it had of necessity, been a job for spare times and will be a good occupation for wet days.

In preparing land for burning, a good deal has been done in the way of blasting the red gums and clearing the roots and stacking timber round the butts of all trees.

On the 1st of March a start was made at the burning and with a contract of 26 acres I hope and expect to have another 75 acres ready for sowing this season.

All land previously ploughed and cropped is being cleared of stones and stumps in order to facilitate the working of the machinery.

Ploughing on land intended for rape, mustard, barley, and early green feeds, is being pushed on steadily, and up to date some 50 acres are ready for harrowing down and sowing as soon as the season breaks.

The last few weeks have put us to the test of our water capacity. The present well does not give us a very large supply, and the work of putting in eight feet of tunnelling in order to increase the supply and the holding capacity of it is in progress. The result has so far been fairly satisfactory, although the supply is not yet great.

A start has been made putting down another well at one of the good trial bores.

The stock are all in fair condition, with the exception of one or two miserable old animals. The milch cows, and in fact all the horned stock, are not doing as well as I would like—falling away considerably of late. This country is undoubtedly unsuited for cattle until it is cleared and cultivated.

The sheep are doing very well, and a good percentage of lambs should be obtained this season. The wether lambs were killed off for mutton much quicker than I anticipated. There are a few left, but it will be wise to reserve them till later on and to purchase more matured sheep.

The pigs are doing well; 16 suckers have dropped since the previous report, nine of which are a very promising litter of good pedigree animals.

We have still several very useful young Berkshire hogs and sows to dispose of for breeding purposes.

The poultry are all well on with their mult, but are laying very few eggs. All the hens are still in the field and doing well. Most of the best cockerels have been disposed of already. We have still a number of Toulouse geese and ganders for sale.

Turkeys.—A few of this season's gobblers are still for sale. Orders are coming freely, but mostly they are for 18 months to two-year-old birds.

The crops are all finished, with the exception of melons and pumpkins and maize and sorghum. The former have given us a fair crop for storing for pigs and kitchen use. The early-sown maize has been mostly cut for the cows, but a small piece left is cobbing well. Later-sown patches (the end of November), which have had scarcely ½in. of rain on them, are now looking very well indeed, being from 4ft. to 6ft. high, and very thick and healthy.

During the month much time has been wasted trying to cut chaff and grind corn with an aermotor that we have as a motive power. The result of this mill is very unsatisfactory indeed, as we seldom have sufficient wind to drive the motor (it being a big cumbersome affair), and never wind enough to drive the two-bladed chaff-cutter more than half full.

Proceedings during March have been largely a repetition and continuance of last month. The season here has not yet broken, although twice it has attempted rain. At present there is every appearance of rain very shortly.

Burning is proceeding so well that we are almost inclined to favour the continuance of the dry weather, as feed and stock water are again fairly plentiful—we having again got the old well working and the supply considerably increased.

The digging of the new well is now well under way, the spot chosen being at the bore up the gully north of the homestead, as the soak in the large cultivation (the original proposed site) is still making water.

Around this latter soak we have a piece of land well suited to the growing of summer crops and vegetables, as it was too wet to carry the teams up to Christmas, and is still quite moist. It is my intention to fence off this piece of country, and, with a similar piece of land near the present orchard, I am convinced that a great deal may be done in the way of summer vegetables and feed for the dairy cows. This will, of course, entail the keeping of a man specially good at this work, but as I already have a very efficient fellow on the orchard, I intend to keep him permanently for the vegetable work as well.

The dairy in course of construction is now well up, and will be completed in a week or 10 days.

Some 60 acres of land are now ready ploughed for the sowing of rape, kale, field-peas, vetches, etc., in order to give us some early feed for the cows and sheep. About 20 acres of new land are ploughed ready for wheat, and some 60 acres are now practically clear for the plough, in addition to what was under crop last year.

Seeding implements, although a very poor lot, are ready for work. I shall try to do without, but I am afraid that it will be compulsory to buy a colonial stump-jump plough, as our ploughs here are altogether unsuited for much of our country.

The stock of the farm are, with a few exceptions, in good order, the exceptions being one or two useless old horses and cows.

Poison is still plentiful in some of the paddocks that are not being stocked. Were we more fully stocked, the poison would be easier to keep in check.

Considering the increased acreage that we have to crop this season, and the very inferior ploughs we have to do the work, our horse-power on the farm is still inadequate.

Pigs and poultry are all in good order and healthy, although of the latter the majority of the birds imported at big prices just before my arrival are very disappointing, coming out very badly after their moult.

EUPHORBIA DRUMMONDII.

During March a plant was submitted to the Government Botanist for identification by the Chief Inspector of Stock, it having been forwarded to him with the view of ascertaining whether it was poisonous or not. The Government Botanist has reported on the plant in the following words:—

"The plant submitted for identification is *Euphorbia Drummondii*, a native of this and the other Australian States, and long known to possess noxious qualities. Euphorbiaceous plants generally may be suspected of being poisonous, and the natural order contains some having powerful medicinal properties, such as castor oil and croton oil, and the milky juice characteristic of the order has acrid qualities, irritating and inflaming mucous membranes, and even the skin, when applied to them. Some small species of Euphorbia found as weeds in gardens, and a larger species known as the Caper Spurge, cultivated as an ornamental plant, are well known as containing the deleterious milky juice. The heads of sheep browsing on *Euphorbia Drummondii* become so swollen and heavy that they are let drop to the ground, while the gullet and stomach are also injured by the herbage swallowed. The poison evidently lies chiefly in the juice of the plant, and though some assert that they have fed stock on the plant without any harm resulting, this is probably owing to the plants used having contained little or no juice."

CHAPMAN EXPERIMENTAL FARM.

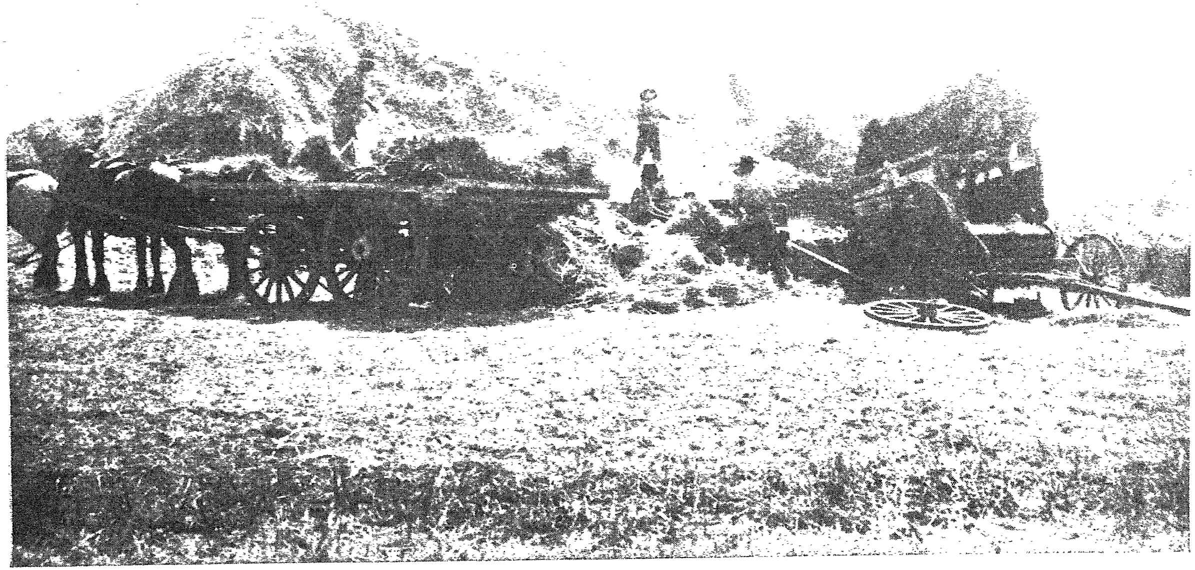
HARVEST RESULTS, 1904.

By R. C. BAIRD.

THE GRAIN CROP was harvested during the month of November and the first week in December. It was all cut with the binder, and threshed with the new treadmill threshing plant. The area threshed for grain was one hundred and fifty (150) acres, which yielded about 2,500 bushels, the results being as follows:—

Variety.	Date sown.	Manure rate per acre.	Character of soil.	Yields per acre, in bushels.
Sullivan's Early Prolific	May 21	Abrolhos guano, 70lbs.	Good light loam; second crop	14·0
Silver King	June 2	Cumming Smith's Super, 112lbs.	Good red loam; first crop...	12·4
Field Marshall	,, 2	Cumming Smith's Super., 112lbs.	Good red loam; first crop...	12·0
Cerraf ...	,, 2	Cumming Smith's Super., 112lbs.	Good red loam; first crop ..	10·5
Australian Crossbred 13	,, 2	Cumming Smith's Super., 112lbs.	Good red loam; first crop...	18·0
Steinlee ...	,, 2	Cumming Smith's Super., 112lbs.	Rich red loam; first crop ...	18·0
Australian Crossbred 1/J	,, 2	Cumming Smith's Super., 112lbs.	Light loam; first crop ...	12·0
Alpha ...	,, 12	Cumming Smith's Super., 112lbs.	Rich red loam; first crop ..	16·0
Australian Crossbred 77	,, 22	Cumming Smith's Super., 112lbs.	Rich red loam; first crop ...	13·6
Majestic ...	,, 25	Japanese Super., 112lbs.	Rich red loam; second crop	15·0
Jade ...	July 6	Japanese Super., 112lbs.	Medium red loam; first crop	12·0
OATS.				
Algerian ...	June 30	Japanese Super., 112lbs.	Good rich loam; second crop	30·0
American Early Ripe	,, 29	Japanese Super., 112lbs.	Part rich loam: part poor gravel	20·0
Chinese Hulless	,, 29	Japanese Super., 112lbs.	Part rich, and part poor gravel	8·0
Australian Crossbred 23	,, 29	Japanese Super., 112lbs.	Medium red loam; second crop	32·0
Garton's B.	,, 29	Japanese Super., 112lbs.	Medium red loam; second crop	12·0
Cape Barley	July 13	No manure	Good red loam; first crop	21·5

HARVESTING OPERATIONS were commenced on 17th October with hay cutting. The weather was stormy, with heavy rain, which lasted for some days, greatly retarding the work. The hay, however, was well stooked, and very little damage was done. As



Tread Power and Thresher (Front View) at the CHAPMAN EXPERIMENTAL FARM.

we have no means of weighing the crop, I can only estimate approximately the result of the hay crop.

Estimated results of hay crop as follows:—

Variety.	Date sown.	Manure, 70lbs. per acre.	Character of soil.	Yield per acre in tons.	Remarks.
WHEATS.					
Sullivan's Early Prolific	May 12	Japanese super.	Medium sandy loam; second crop	1½	Fair quality
Clinch's IXL...	,, 23	Cumming Smith's super.	Light sandy soil; second crop	1	Good quality
Queen's Jubilee	June 28	Japanese super.	Good red loam; second crop	1½	Straw strong, good hay wheat
Majestic ...	,, 25	Japanese super.	Good red loam; second crop	1¼	Stands well; good quality hay
OATS.					
Algerian ...	,, 30	Japanese super.	Medium red loam; second crop	1½	Fine straw; good quality hay.

NOTES ON THE CHAPMAN EXPERIMENTAL FARM.

By R. C. BAIRD.

The past month has been a fairly hot one, with an occasional cool change. Threshing operations were completed, and all the grass carted to the barn. Grading the wheats was commenced at the end of the month and will be continued until we have completed all the varieties.

One plough has been started to prepare some land for the rape crop, which I hope to get in early this year. Another plough will be started in the course of a few days.

The pastures are now getting very bare and some of the young sheep are showing signs of falling off in condition.

The horses and cattle are still in very fair condition and appear to be holding their own remarkably well.

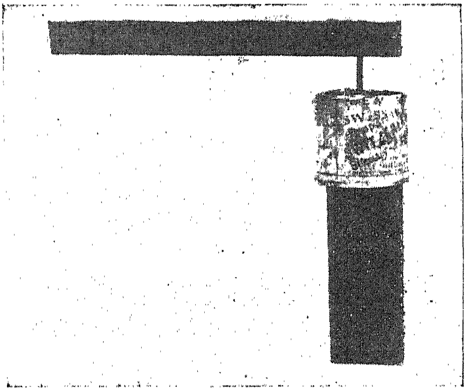
Mullenising in the home paddock has been proceeded with and is now nearing completion.

The chief work on the farm for the month of March will be the winnowing and grading of seed for sale. Ploughing for the general crops will be pushed on with all speed, so as to insure early sowing, and the erection of some division fences will be commenced.

[NOTE.—This was received too late for use in the March issue of the *Journal*.—ED.]

TICK-PROOF ROOST.

This illustration shows a very simple and inexpensive form of a tick-proof perch:—



The upright (1) is of 3 x 2 jarrah, and is sunk into the floor of the fowl-house, leaving from 1½ to 2 feet above the ground. Then take an empty milk tin (2), first make a small hole in the centre of the bottom of the tin, continuing through for half an inch into the upright, then tack the tin on by using a long-headed hammer or an iron chisel. Then take a six-inch spike (3), knock off the head, and drive the spike into the upright. To make the cup water-tight run in melted sealing wax or pitch, thoroughly covering the bottom of the tin. The perch (4) has a hole bored half-way through to hold the perch in position. The cup (2), if always kept filled with liquid, will prevent tick crawling up to the fowls, and if a rag is kept round the upright it will act as a trap, and can be removed frequently to see if it contains ticks. The cracks and crevices in the perch (4) should also be inspected to see if they harbour young tick, which have dropped off the fowls. All perches should be the one height, and quite away from the walls of the fowl-house. All nest boxes must also be made tick-proof by being composed entirely of metal, or resting on tick-proof stands, in a similar manner to the perches. Also see that no ticks harbour under the milk tin where it rests on the upright.

POULTRY NOTES.

By FRANK H. ROBERTSON.

TICK-PROOF PERCHES.

One of the most important things to remember in dealing with the tick pest is to see that the perches are made tick-proof. This is just where so many poultry-keepers fail: they go to no end of expense in demolishing the old tick-infected houses and building new ones which are carefully constructed so as to offer no harbour for the pest, but unless the new perches are fixed in such a manner that the fowls when roosting at night cannot be molested by these pests, all the labour and expense may be for naught, because a few ticks may still be in the locality. They multiply very quickly, hence the newly-erected building will in a short time be as badly infected as the one destroyed. The great point to remember is, do not let the ticks have a feed—that means, do not let them get at the fowls—and to prevent this, specially constructed roosts or perches must be used. Opposite these remarks will be found an illustration of a very simple and inexpensive perch, which, if used according to instructions, will give the relief which it is sought by the Department to give.

It is also necessary to make all nest-boxes tick-proof. This can be easily done by making a raised platform, the uprights of which are fitted with tins the same as the perches.

One more point has to be illustrated: harbours for any stray tick which may have escaped destruction. They will, of course, try to reach the fowls on the tick-proof perches, but, being baffled in their attempts, will retire to the handiest shelter; therefore, if rags are wrapped round the upright posts, the ticks will be found in them, and thus easily destroyed. A rag also round the perch itself will also act as a trap for larvæ tick which have dropped off the fowls.

SOFT-SHELL EGGS.

Soft shell, or more strictly, shelless eggs are known to every poultry-keeper, and if at all frequent should be a warning that there is something wrong with the hens, and steps taken to remedy the defect. It may be owing to the birds being too fat, or want of lime-forming grit, such as oyster or ordinary sea-shell. Another frequent cause is over-stimulating food and the excessive use of spices and condition powders, which cause the production of yolks at a greater speed than the secretion of the lime can be produced in the oviduct. Sudden fright, or being chased too much, will also cause the laying of a soft-shell egg.

When one examines the marvellous egg-producing organs of a hen, the wonder is that irregularities do not occur oftener, for it must be borne in mind that fowls, in their original state, laid only sufficient to propagate their species; but domestication has now produced fowls, that, unless they lay over 100 eggs per year, are not considered worth their keep.

As a remedy, feed the fowls sparingly on light food, giving plenty of greenstuff, and give occasional doses of Epsom salts; and if the weather is mild add a little flower of sulphur to the soft feed, taking care that a supply of shell-forming material is always accessible.

UNPROFITABLE POULTRY-KEEPING.

The following is culled from the *Rushden Argus*. A hen-keeper writes:—"One of my six hens has just laid an egg—the first since harvest, although we have bought and given them three bushels of corn, at 4s. 3d. per bushel, and the remains of legs of mutton, ribs of beef, mashed potatoes, and carrots and green stuff *ad libitum*. Here is the balance-sheet: Bought six hens at 2s., 12s.; three bushels of corn at 4s. 3d., 12s. 9d.; bread and potatoes, say, 1s.; greens, etc., thrown in; cleaning the 'henery,' 1s. Income, one egg, 1½d.; out-of-pocket expenses, £1 6s. 7½d. It is often asked, do hens pay? If the above has anything to do with it, I say no. What do you say?"

Many people are to be met with who can give similar experiences, and are quite satisfied that it does not pay to keep fowls. The cause of failure is not far to seek, and can safely be put down to unlimited feed and no exercise, resulting in an abnormal growth of internal fat, which paralyses the internal organs and prevents the production of eggs. Where fowls are kept in small enclosed runs this trouble is always likely to occur. The best plan is to adopt the American scratching shed system; or at least always bury the hard feed, so that the fowls have to spend a considerable time in scratching for the grains.

SHELL AND STONE GRIT.

Hens can and do yield a plentiful supply of eggs on runs apparently devoid of shell-forming material, but if the area is of limited extent, the supply runs out; the birds then draw on the lime contained in their food, which in course of time becomes exhausted, and soft-shell eggs are a frequent result. As a means of preventing such, it is always advisable to have in the yard a tin of shell-forming material for the fowls to help themselves to as required, in the shape of crushed oyster shells or ordinary sea-shell, which is on stock at most storekeepers.

In addition to shell, a constant supply of sharp grit is necessary, as is proved by the fact that it is eagerly consumed by fowls which have shell constantly before them, they require both. Too many poultry-keepers rely entirely on the shell for both purposes, the forming of the lime to envelop the egg, and for digesting the food. Any hard stone will make a suitable grit, but it must be sharp, and not smooth and water-worn. Quartz makes an ideal grit, but it should not be broken up too small; for full-grown fowls not less than a split pea is the correct size. That large-sized pieces are preferred, is noticeable from the fact that all the large ones are picked out first. Such grit is, however, in many localities difficult to obtain; but anyone who likes to go to the trouble can get a bag of hard stone of some sort and convert it into the thing by passing it through a poultry grit mill and grain crusher, which is obtainable at the moderate cost of from £1 10s. to £2.

THE POULTRY INDUSTRY IN ENGLAND.

The interesting report of the poultry industry in England for 1904, annually issued by Mr. Edward Brown, Secretary of the National Poultry Organisation Society, is given in full.

All persons who take an interest in poultry-raising will find this report well worthy of careful perusal, and even those who are unaware of the value of eggs will find there stated figures which show what an extensive industry it is. For instance, Mr. Brown states that "Upon the farms of the United Kingdom three times as many poultry could be kept as are to be found at present without displacement of any crop or stock; and if that number were kept, about £19,000,000 sterling would be added to the food production of the country."

The same thing holds good among our Western Australian farmers. They have the land, grow the grain, and could at least double or treble their egg output without displacement of crop or stock arrangements; all that is required is a little more care and attention to the matter, which would result in individual pecuniary benefits and a material addition to the wealth of the State. The report reads as follows:—

"Spite of the fact that in many departments of industry and commerce 1904 has been the most trying of recent years, yielding very inadequate returns for labour and capital, such would not be a correct description of the poultry industry, which has been in a prosperous condition. Demand for produce has increased, and prices have been more than maintained. It is clear that consumption is growing more rapidly than production, and that the inquiry for better qualities is greater than ever before. Fortunately, the breeding season was much more favourable than were the two previous years, both as to spring and summer. Thus the work of hatching and rearing was comparatively easy, and results satisfactory. There was much less complaint as to infertility of eggs and death in shell than in previous years, due no doubt to the fact that poultry farmers are learning better methods, but equally to climatic conditions, which latter must always have a marked influence, as in all classes of stock.

"In previous annual summaries, of which the present is the tenth, attention has been called to the growth of special establishments where egg and poultry production is the leading feature, in some cases upon an extensive scale. During the last year the number has largely increased, and a considerable amount of capital is now invested in this branch of food production. But, what is more to the point, the experiment stage is practically passed. Failures there are, and will be, as in every business, even those recognised as ordinarily profitable. But because some traders or manufacturers enter the bankruptcy courts we do not argue that their respective businesses cannot be made to pay. Nor need it be any longer so with regard to poultry-farming. Given the necessary knowledge, skill, capital, and perseverance, under suitable conditions, success can be achieved. Almost every failure can be explained by the absence of one or more of the above qualifications. Extensive poultry-keeping requires capital to a greater extent than when carried out as supplemental to ordinary farming or fruit-growing, which fact is too often forgotten. Part of the capital should consist of sufficient means or income to provide maintenance during the process of formation or development; say for the first two years. Whilst recognising the value of poultry-farming upon extensive lines, we must not forget that the greatest profit will be secured by farmers who obtain an additional revenue without increase of rent and probably of wages. Upon the farms of the United Kingdom three times as many poultry could be kept as are to be found at present without displacement of any crop or stock; and if that number were kept, about £19,000,000 sterling would be added to the food production of the country.

"One of the factors which have contributed to the success of special establishments, as of poultry-keeping upon farms, is that the difficulties often attendant upon the artificial rearing of chickens have been largely overcome. There can be no question that at one time it was doubtful whether this would be so. It almost became an axiom that artificial hatching was possible, but artificial rearing improbable. The mortality among some incubator-hatched chickens was serious in the extreme, often reaching 40 to 50 per cent.; whilst 5 to 10 per cent. would be the average under hens. But all that has been changed, and by a better appreciation of the needs of the birds themselves, the mortality in one case need be no greater than in the other. In an experiment conducted at the College Poultry Farm, Theale, last spring, out of 60 chickens hatched and reared artificially, only one died, and that at two days old; and, taking the entire season—with an output of more than 3,000 chickens and ducklings—the loss from February to July was not quite 3 per cent. Plain food, exercise, and absence of coddling are the secrets; but the greatest of these is exercise. Making the young birds work for their food from the first strengthens the frame and muscles and protects them against all the ills that fowls are heir to. As a result, the use of incubators and brooders is growing rapidly, and what was at one time impossible is within the reach of many. A further point to be noted is, as we might expect, men are taking up poultry farming much more than was the case at one time, which is all to the good, as they can handle bigger concerns than is usual with the opposite sex.

"Taking the four sections of the kingdom, progress has been rapid in England and Ireland, is steadily moving in Scotland, and at last Wales is coming into line with other districts. So far as my observation and information go, the quality of both eggs and fowls is advancing on all sides, but special attention to this point is required. Irish supplies are better than we have known before, although there is yet much to be done ere the results are entirely satisfactory. The influence of technical instruction—for nearly all the Irish counties are now provided with poultry teachers—is making itself felt, and it may fairly be anticipated that the next five years will see a remarkable change in the country. The growth of co-operation both in Ireland and Wales cannot fail to assist greatly in that direction, by increasing returns as a result of better methods of marketing; but to attain the full measure of success producers must advance to a similar degree. In this connection, it is interesting to note that in the report of 'Distribution of Grants for Agricultural Education and Research,' recently issued by the Board of Agriculture, it is shown that during the last year 13 counties in England and 11 in Wales provided no instruction in poultry-keeping under their technical education schemes. But the subject is dealt with at several of the leading Agricultural colleges.

"For several years I have urged that systematic experiments should be undertaken, and it is satisfactory to state that the importance of this work has at last been realised. During the year reports have been issued by the University College, Reading, the Wye College, the Cornwall County Council, and the Lancashire County Council in England, and by the Department of Agriculture and several of the County Councils in Ireland, dealing with branches of the subject upon which definite information was needed, and we hope that there may be a great extension of such inquiries, which can only be undertaken by public bodies and institutions. That there is a great field for research cannot be questioned, and a multitude of problems are awaiting solution. It is essential, however, that whilst due proportion of scientific investigation be undertaken, in order to indicate the lines upon which future developments may follow, the practical side should ever be kept in view. Such knowledge as we possess is largely the result of observations by poultry-keepers, but it needs to be confirmed or corrected by those who are able to bring scientific methods to bear upon the question. We want to know the why as well as the wherefore. In no branch is there more to be accomplished than in respect to feeding, both for ordinary and special purposes; and I, for one, believe there is much to be learnt in that direction, and am ready to welcome the results of practical observation and experiments. But such must be on a clear and definable basis, and issued in a form that is easily understood.

"As was mentioned a year ago, prices for eggs and fowls of first rate quality were higher than ever before, and the same has continued to be the case. The reason is not only a rapidly increasing demand, but improvement in the methods of marketing. In the neighbourhood of our great cities or residential and manufacturing districts, eggs especially can be sold at any period of the year at remunerative rates, and these reach the consumers when in first-rate condition, so that no method that could be devised would, under such circumstances, increase returns to producers or secure to consumers better quality. Such districts, however, do not and are not likely to supply the local needs, and what more is required must be obtained either from the agricultural counties or from abroad. Where the point of production is distant from that of consumption, prices although even there an increase has been evident of late are very unsatisfactory, as low as in some foreign countries, due to the antiquated methods yet in vogue, and to the fact that eggs are by no means in good condition when they are sold. So it will remain, under the present want of system. The best remedy for this state of things is co-operation, by which producers, through their local societies, are brought into direct contact with retailers, and can insure rapidity of transit, which is all-important in any perishable article. We have now abundant evidence from depôts affiliated with the National Poultry Organisation Society that enhancement of returns can, and can only, be obtained when eggs are sent forward expeditiously and in good condition. It is to the extension of combined effort on the part of poultry-keepers we must look for increased profits. That is also true in the case of table poultry, but too often no attempt is made to fatten them, and the birds are sold in lean condition, when they are of small food value. At the same time, in many districts, farmers and others are entirely in the hands of local buyers, who form rings to keep down prices. These can be broken by combination on the part of the producers. One instance will suffice. In an eastern county last May I was shown a nice lot of spring chickens, but was told that they would not realise more than 4s. 6d. per couple in the local market a ridiculously low price at that time. I gave the name of a buyer, suggesting that a dozen be sent as a sample. The return was 7s. per couple, leaving, after payment of carriage and commission, 6s. 4d. per couple an increase of 11d. per bird. But the best part of the tale is to come. The local buyer, on hearing he would not obtain more chickens, actually gave 6s. 4d. per couple for the remainder. The unfortunate weather which prevailed just prior to Christmas seriously affected the trade in geese and turkeys, and prices were lower than they have been for several years. This may be regarded as exceptional, and breeders will do well to keep turkey production in view, more especially if they go in for first-class quality.

"That poultry-keepers should aim to produce the finest quality of eggs and poultry is unquestionable. It is there where the profit will be made. A prolonged tour which I recently made throughout

Mid and South-Eastern Europe has confirmed previous observations over the greater part of the Continent, and leads me to the conclusion that poultry-keepers of the United Kingdom have little to fear from foreign competition, provided that they will take advantage of their opportunities and produce the finest qualities of eggs and poultry, and market in the best manner.

"In 1902 and 1903, respectively, very large increases in imports of eggs and poultry and game were reported, amounting in 1903 over 1902 to no less a sum than £452,676, but although there was an increase in 1904, taken from the trade and navigation returns, the following figures will show that it was comparatively small. We give the figures for the three last years:—

	1902.		1903.		1904.
	£		£		£
Eggs	6,308,985	...	6,617,599	...	6,730,574
Poultry and game	1,059,044	...	1,202,288		1,089,044 poultry 128,132 game
	£7,368,029		£7,819,887		£7,947,750

For the first time, poultry and game in 1904 have been separated in the return, and for purposes of comparison we have included the latter. It will be seen that the increase in imports of eggs was in value £112,975, and of poultry and game £14,888, or a total of £127,863.

"So far as eggs are concerned, the total imports during the year amounted to 19,942,595 great hundreds, or a total of 2,393,111,280, an increase of 11,243,640, or a fraction under 0·47 per cent. over the year 1903. Increases are recorded from Russia, Germany, Belgium, and France, and decreases from Denmark, Canada, and other countries, and it is evident that Eastern and Southern Europe are sending greater supplies. The relative imports are given below:

	Quantities in Gt. Hundreds.		Values. £		Per cent.
Russia	7,032,906	...	2,042,520	...	35·27
Denmark	3,602,326	...	1,461,459	...	18·07
Germany	3,554,232	...	1,191,161	...	17·82
Belgium	2,517,073	...	837,120	...	12·62
France	1,698,614	...	710,057	...	8·51
Canada	317,722	...	129,631	...	1·59
Other countries ...	1,219,721	...	358,626	...	6·12
	19,942,594	...	£6,730,574	...	100·00

As previously mentioned, the last country through which the goods pass received the credit for them, and those recorded as from Germany are largely South Russian, Roumanian, and from Eastern Prussia; whilst the Belgian are from Italy, Austro-Hungary, and the Balkan States.

"The average values during the past three years are as follows:—

	s.	d.	
1902	6	7½	per great hundred
1903	6	8	,, ,,
1904	6	9	,, ,,

So that even with increased supplies both at home and abroad prices show a tendency upwards. There are, however, very suggestive fluctuations in the values from the respective countries:—

	1902.		1903.		1904.		
	s.	d.	s.	d.	s.	d.	
Russia ...	5	7¾	6	5½	5	9¾	per great hundred
Denmark	7	9	8	6¾	8	1¼	,, ,,
Germany	6	5	6	5¼	6	8½	,, ,,
Belgium	6	3½	6	4½	6	7¾	,, ,,
France ...	8	6½	8	4¼	8	4¼	,, ,,
Canada	8	1	7	10	8	2¼	,, ,,
Other countries	6	2	5	11½	5	10½	,, ,,

Danish have lost the first place in price which they held a year ago, and it is evident that South European eggs are steadily improving in quality.

"With regard to poultry the figures are:—

	£
Russia	343,761
Belgium	248,552
France	235,700
United States	219,787
Other countries	41,244
	£1,089,044

"Upon the basis which I adopted a year ago, the total consumption of eggs and poultry in Great Britain would be:—

	Eggs.	Poultry.	Totals.
	£	£	£
Foreign produce	6,730,574 ...	1,089,044 ...	7,819,618
Irish ,,	1,950,000 ...	450,000 ...	2,400,000
British ,,	4,700,000 ...	2,750,000 ...	7,450,000
	£13,380,574 ...	£4,289,044 ...	£17,669,618

Of which sum the production in the United Kingdom is represented by almost £10,000,000 sterling, which could be greatly increased without much difficulty or displacement of any present crop or stock."

WHAT IS THE POULTRY POSITION IN WESTERN AUSTRALIA?

This was the first of a series of questions asked of Mr. Woodward, in Adelaide, a short while back, after his recent visit to Western Australia, and his replies were as follows:—

"I think that at the present time W.A. offers better opportunities of a great and rapid development in poultry work than any other part of Australia. They have many natural advantages. A climate which is in my opinion splendid for poultry. With good, open yards, and plenty of natural shelter housing is unnecessary, except, of course, for chicks. The soil is, as a rule, light, and is, if not overstocked, able to carry a flock of fowls in perfect health for many years. Another advantage is," continued Mr. Woodward, "that green feed is easily grown, and I found that in well-sinking water is usually met with near the surface." This, of course, refers only to the neighbourhood of Perth, where Mr. Woodward spent most of his time; and he is not to be held responsible for the balance of the million square miles which go to make up W.A.

"The price of eggs and dressed poultry is, of course, the chief factor in poultry farming. In Perth I found that at the time of my visit eggs were selling at 2s. 8d. per dozen fresh; 1s. 4d. per dozen for imported. Table birds were fetching 7s. and 8s. per pair, though the quality was only medium. Still, I think there will soon be an improvement in this, for farmers are beginning to recognise the value of the pure bred."

"Then, on the whole, you are pleased with what you did, saw, and heard in the West?" I said. "Yes, I took over a lot of birds, and sold all at from 20s. to £5 each. I enjoyed myself immensely, for fanciers and others were most kind. I received an invitation to judge at the Perth Show in June, and I saw enough to know that there is a big future before poultry and poultry-breeders in Western Australia. The local men are making great strides, but production is still a long way short of consumption. The West Australian bill for eggs and birds imported was nearly £100,000 last year. They hope to alter this before long, and they will."—*The Garden and Field.*

NOTICE.

Proprietors of newspapers wishing to republish any matter contained in the *Journal* are at liberty to do so, provided the usual acknowledgment is made.

BEACONSFIELD AND COOGEE DISTRICTS.

By T. HOOPER.

On 1st March I paid a visit to Beaconsfield and Coogee, and saw some of the finest crops of grapes I have seen in this State. My trip was a very pleasant one, as I met many old friends, and was pleased to see that they had effected great improvements in their orchards.

A few years ago I liberated about 75 *Leis conformis* (ladybirds) in Beaconsfield, and now there are thousands throughout this district and Coogee. They are doing good work, feeding on the *Woolly aphis*. I noticed during my trip a number of citrus trees which in the past were severely infested with the Black Scale (*Lecanium oleœ*). These are practically clean through the good work done by parasites liberated there not more than 12 months ago. The most pleasing feature, however, of all, was the absence of the fruit fly. Scarcely any fruit has been lost in these districts this season, and I put it down principally to the care with which the diseased fruit has been gathered and destroyed during the previous fruit season. This proves that when growers are careful to search their trees for maggoty fruit, in addition to keeping the ground (daily) cleaned of fallen and diseased fruit, they are amply repaid the next season for the trouble they have taken in having boiled the fruit thus found, the previous season.

Unfortunately, there are many growers who do not recognise this, and until the inspector comes along they are content to let diseased fruits hang on the trees and remain on the ground. I am sorry to state this pest has also made its appearance in an orchard near Donnybrook and a garden in Albany, but owing to prompt measures we hope to stamp it out. I consider, that, where orchards are some half-a-mile apart, that the man who suffers from the fruit fly to any extent, has himself to blame.

There is no doubt that through Mr. Compère, the department will eventually establish the parasite of the fruit fly with satisfactory results, but until then, it behoves every grower to do what he can to check the pest.

The districts also of Claremont aud the Darling Ranges show a decided improvement. Orchards that used to be infested with the fly are this year comparatively free.

INFLUENZA AMONGST HORSES.

By R. E. WEIR, M.R.C.V.S.

Owing to the prevalence of this disease amongst horses recently, and the possibility of its again appearing during the winter months, its treatment should prove a subject of interest to many of the readers of the *Journal of Agriculture.*

Although the complaint is more commonly met with during the cold bleak winds of winter, it is not an uncommon one during the hot season, as in the extreme heat of summer its presence is known, in fact, it might be stated that no season of the year can claim immunity. Young horses are more liable to contract the complaint than older ones, though when attacked are not so likely to succumb to it as those of more mature years. The infectious nature of influenza has long been fully recognised, but the micro-organism which produces the complaint has not yet been fully determined. It is positively known that infection is chiefly of an aerial source, and the medium by which it gains entrance into the system is through the respiratory tract, but instances occur where it can only be supposed that the digestive tract forms the avenue of approach, as, for instance, a recent outbreak occuring in one of our country districts was ascertained, on investigation, to have originated at a public watering trough, where others which had previously suffered from the complaint had been in the habit of watering. Over work, want of care in providing comfortable stabling, and exposure in cold bleak paddocks during the winter, are the more common predisposing causes.

The incubation period is usually limited from five to seven days, this being the interval before symptoms are generally noticeable. Febrile disturbances and great prostration of strength are early apparent. These are succeeded by inflammatory appearances of the mucous membranes of the nostrils, eyes, throat, and, to some extent, the digestive tracts. The throat affection is very noticeable when the animal drinks, a distinctive gulping sound is heard with each swallow, and a small stream of water may be seen flowing back through one or both nostrils. Considerable pain is also apparent when pressure is brought to bear on the part. The tissues and glands of the throat frequently become swollen, the inflammation sometimes resulting in abscesses from which a discharge of pus frequently occurs. The white of the eye generally presents a yellowish appearance, showing that the liver is more or less implicated in the disease. A discharge of a watery nature first flows from the nostrils and afterwards becomes more flaky, and the odour is of a somewhat offensive nature. A slight cough is present in the early stages but afterwards becomes more pronounced and painful. The temperature is usually high, and varies considerably on the surface of the body. There is a great depression of muscular force; the animal stands with the head depressed, and bears a dejected appearance. Stiffness and weakness is visible when made to move. This will be specially noticeable from the swaying motion of the hind quarters. Swellings may appear at different parts of the body, but those usually disappear as recovery takes place and without any special treatment. Should no complications occur mortality from the disease is unlikely.

Recovery usually takes place within a week, but from neglect or other causes the disease may continue and the lungs become implicated. In some instances pneumonia may occur from the outset, and in this case recovery is somewhat doubtful. Like all infectious diseases, influenza runs a definite course, and no treatment can stay its progress, but should careful nursing be instituted without delay it is very unusual for losses to take place. The affected animal requires to be immediately isolated from others on the place and placed in a comfortable stall or loose box.

A good warm rug covering is necessary during the winter months, and a light one in the event of the weather being warm. Light easily digested food, consisting of bran and chaff, with an occasional supply of linseed, is to be given at frequent intervals during the day time, and on no account is any to be allowed to lie in the box and become sour, as this seriously affects the patient's appetite and delays recovery. Cold fresh water is always to be kept handy for the animal to drink, this being an essential in the successful treatment of the complaint. The throat requires treating with applications of mustard, and should any lung complication exist, this can also be applied to the chest immediately behind the shoulder. No treatment is usually necessary for the bowels, but if need be these can easily be regulated with small doses of Epsom Salts. As a rule, to allay the fever, ½oz. of nitre placed in the drinking water night and morning for a few days, will have the desired effect.

COLLAR-ROT ON CITRUS TREES.

The decay of the bark of citrus trees at and below the surface of the ground is a disease as widespread as citrus culture itself. It is known in Florida and California as foot-rot or gum-disease, in Australia as collar-rot, in Italy as Mal di Gomma, and in Spain by a like name. As there are several forms of gum-disease affecting citrus trees, and as they arise from wholly different causes and have no necessary connection with each other, the name "gum disease" is not distinctive, and therefore not wholly satisfactory.

CAUSE UNCERTAIN.

The cause of collar-rot is still open to question. Several pathologists have reported upon what they believe to be the cause; but if any one of the organisms found by these writers is the true cause of the disease, the peculiar accompanying conditions are so essential to its development that for treatment in Australia we need only to know the latter and to act in time.

This form of the disease is first detected on the trunks of trees close to the ground, and is an exudation of the sap, which breaks through the bark and congeals in the form of a gum. No citrus tree is free from the disease, and one of the newest facts regarding its appearance is that frequently the finest trees are attacked. It often happens that in making a search for the early development of the disease no trace of it is observed until exudation has freely commenced. It often happens, too, that in digging away the surface soil around the stem little more than a black scratch, about one to two inches long, has been discovered, which, when cut open, shows the gummy fluid more or less encircling the wood under the bark.

REMEDY FOR THE GUM DISEASE.

The best method of controlling this disease is to cut away the bark surrounding the place from whence the gum is oozing, in order to detect the main parts affected. The wood where the gum is oozing is cut out with a chisel and left for a day or so, to determine if all the disease has been removed. If it is not altogether removed, the affected parts soon commence to ooze out gum, when more of the wood is cut until it ceases.

Yellow streaks of sour sap are generally seen in the grain of the wood, which are traces of the disease. If the affected parts show no further exudation, it is proof that the disease has been removed, and the affected parts so treated are either painted with tar or with carbolic lotion, using one ounce of carbolic crystals to three pints of water, and then painted with shellac composed of gum dissolved in methylated spirits. Where the disease has reached around the tree there is no possible cure for it and in such cases it is better to remove the tree and put a healthy one it its place. The spot where the tree stood is disinfected by a slacking of fresh lime, and leaving the ground exposed for a reasonable time.

NATURE, BACTERIAL.

This disease, being of a bacterial form, all chips ands crapings should be carefully collected and burned, to prevent the spread of the disease through the orchard. The tools should also be dipped in some disinfectant before being used on other trees.

Some growers are led to believe that badly-diseased trees can be restored to perfect health by cutting back the tops and removing all large limbs to force a new growth. In all badly-infected trees there are always a few healthy roots that furnish enough vitality to the tree to keep it alive. The cutting away of all the foliage forces new growth, and, while the trees sometimes produce large, coarse, puffy, and sour oranges for a few years, they finally succumb to the effects of the disease, and it is only a waste of time and energy to try to restore them.

CARBOLIC ACID REMEDY.

Crude commercial carbolic acid used in various strengths has been found to be the best remedy. When mixed with its own weight of water it was found to answer the purpose admirably, the gum having been previously cut away, so that the application could be made directly on the parts most affected. The result in almost every case was that new bark began to grow over the diseased parts at the lines where the old bark was healthy.

In cases where the roots had become affected, the ground was carefully pulled away from the roots of the tree to the depth of from six to ten inches, and, after a day or two of exposure, the diluted carbolic acid was applied, and in the course of three or four weeks a second application was made, when the soil was put back to its original position, and subsequent applications of diluted carbolic acid were made, from time to time, above the surface of the ground.

Too much care cannot be exercised in the use of carbolic acid. The strength of the commercial acid varies, and it must be diluted to such an extent that the vegetable tissues will not be destroyed by it.

HEALTH FACTORS IN LIVE STOCK MANAGEMENT.

At the February quarterly meeting of the Geelong Agricultural Society, Victoria, Mr. S. S. Cameron, M.R.C.V.S., Veterinary Surgeon to the Victorian Public Health Department, delivered an address on the above subject to the members of this society, and in the course of his remarks laid emphasis on several of the necessary details in connection therewith. Principal amongst them were the following:—

SOIL EXHAUSTION.

In dealing with this and other matters Mr. Cameron says:—"While I think this is a matter destined to loom largely in connection with the future health and well-being of stock in Australia, it is one that can be controlled or influenced in the direction of avoiding ill effects, for it is, in a great measure, a question of local stock management and grazing custom. Ever since and shortly after the sheep industry got firmly established in Australia it has been known that certain tracts of country would become, in a shorter or longer period, what is termed 'sheep sick,' and now, at the end of about 15 years, during which time the dairying industry has largely increased, some areas in Victoria, at all events, are suspected of being 'cattle sick.' This means that the virgin land, through continuous grazing, has become deficient in certain mineral constituents, and that, consequently, those plants, to the growth of which such mineral matters were essential, have died out, and plants of inferior quality, so far as milk production (or in the case of sheep, wool production) is concerned, have taken their places. In other words, the grazing of one class of animal on the same land for a number of years has almost completely altered the character of the herbage, and while the pasturage may look as well as ever, and may be as good for the grazing of another class of animal, its substance for the purpose for which it was used has greatly deteriorated.

OVERSTOCKING.

"Overstocking of pastures is closely associated with soil exhaustion. Apart from the ill effects of continuous grazing, as just mentioned, and which become much increased when paddocks are overstocked, and apart also from the actual fouling of the herbage by excess of animal discharges, the worms and parasites which they contain, and 'the trampling of many feet,' there is the further disadvantage that the good grasses are continuously eaten off as they shoot into growth, and are thus prevented from seeding. In this way the extirpation of much wholesome and nutritious herbage is hastened. At the same time, useless, and perhaps actually harmful and noxious plants which are not eaten by stock until the pastures are bare of the more valuable grasses, are permitted to flourish and seed until eventually the unnutritious plants predominate owing to the good grasses having been eaten out.

"A familiar illustration of this is the gradual usurpation of a pasture by Yorkshire fog grass. Wherever this grass is sown with sweeter grasses, the latter are eaten down continually, while the fog is neglected by stock owing to its harshness, and, being a strong grower, it soon takes possession of the pasture. Again, as another illustration, take the well known rib-grass, or plaintain. It is a useful grass on sheep country, being relished by that class of stock. Cattle, however, neglect it, and on holdings where cattle are exclusively kept, it becomes a nuisance not only on account of its spread, but because its flat habit of growth entails great waste of ground surface that could otherwise be better utilised by growing more suitable grasses.

"Even in times of plenty the folly of overstocking is not less acute, for then the less valuable and noxious plants are left still more severely alone by stock, and they then propagate and spread their baneful presence over the whole pasture, occupying ground that would otherwise accommodate herbage of a more nutritious character. Truly the factors operating towards the deterioration of Australian pastures are many, and this being so the time has arrived when remedial measures demand the most thoughtful attention of all farmers and graziers.

FOOD AND WATER.

"The food and water supplies are important factors in the maintaining of the health of stock. On the one hand, excess of food, either in quantity or quality, may predispose an animal to indigestion, colic, congestion of the liver, and like derangements of the digestive functions; and, on the other hand, lack of food or starvation, by inducing debility, will lay the system open to the successful attack of germs and other direct causes of disease. Unsuitability of food is equally likely to pave the way for disease. Feeding on musty hay, for example, for a lengthened period will, if it does not actually cause the disease, at all events precipitate an attack of asthma or broken wind. New hay and partially fermented chopped foods are notorious as auxiliary causes of colic, hoven, and other bowel disturbances.

"While it may be admitted that horses do not require that their food should be varied to the extent requisite in man or other omnivorous animals, all experience points to the advisability of an occasional change of food. A diet which is suitable in the depth of winter is not calculated to be health-maintaining during the excessive heat of summer, yet the wheaten or oaten hay or chaff ration is seldom altered; and if supplemented, it is by the addition of oats or bran, by which the monotony is not varied. The want of variety is rarely relieved by the giving of carrots or other alterative food, and it is very exceptional for barley, maize, beans, peas, or linseed foods to be used. At certain seasons green stuff may be given, but, consisting as it usually does of young oats, it is no change, such as an occasional feed of green vetches, peas, beans, or prairie grass would be.

"What has been said regarding food in excess or deficiency may apply also to water, although animals will rarely take an excess of water if they are allowed continual access to it. On many extensive grazing areas throughout Australia, and particularly during drought periods, the only available supply of water is that contained in natural waterholes or artificial tanks. Such stagnant water is always highly charged with vegetable growth, and often with the urine and excrement of animals who have unrestricted access to it. In hot weather it is likely to become putrid and filthy, and it forms an ideal developing medium for legions of animal parasites—fluke, tapeworms, and the like. Hence the extraordinary prevalence of intestinal and other parasites in Australian domestic animals, particularly dogs and sheep; and hence, also, the fact that, excepting Iceland only, hydatid disease in man is more prevalent in Australia than in any other country in the world.

"Contaminated water, by virtue of the organic matters and microbes it contains, is often an exciting cause of disease. Indeed, there are grounds for believing that the influence of contaminated water in the propagation of various epizootic diseases has not been given sufficient weight. From the known method of the spread of typhoid fever in man it may be very well argued that animal diseases of a similar type are also frequently 'water-borne.'"

THE BERKSHIRE PIG.

The Berkshires are among the oldest, best known, and most popular of the improved breeds of swine. Their great adaptability to a variety of conditions, together with their early maturing qualities, and their ability to stand up under heavy weight, has earned for the improved Berkshire a place well up toward the head of the list as a general purpose or farmers' pig. To the many admirers of the trim animals of this breed which are to be seen in abundance at every leading show, something of the history of their development should be of interest. However, like many of the older breeds of stock of undoubtedly "blue blood," it is somewhat difficult to give their genealogy with accuracy.

As the very name implies, the breed is of English origin, and first attained a position of prominence in the County of Berk, or Berkshire, England. However, these original Berkshires were very different from their descendants of to-day, and it is considered doubtful if the breed attained to any considerable degree of perfection in its home county, the prevailing opinion being that the earliest marked improvement of the breed was made by the breeders of some of the other counties of southern and central England.

These original Berkshire pigs are generally described by all authorities as large, raw-boned, coarse pigs, with pendant ears, and of a colour ranging from a tawny white to a sandy red or black and variously spotted. It is thought by some that these early Berkshires were from the same ancestry as the Tamworth, and from the descriptions given it would seem that they more nearly approached that breed in type than they did the Berkshires of the present day.

Indefinite as is this description of the foundation stock from which this useful breed has been evolved, the means by which this improvement was brought about seems to be equally uncertain. Some writers tell us that the Chinese, Siamese, and Neapolitan crosses were used, while others draw the line at the Neapolitan cross, contending that the improvement was brought about entirely by crossing with the Chinese pigs, and still others affirm with equal certainty that the principal improvement was due to the use of Italian and Spanish crosses during the latter part of the eighteenth century.

Among the first mentioned of the early improvers of the breed are Richard Astley and Lord Barrington. Lord Barrington did his best work as a breeder between 1820 and 1830, and it is asserted by some authorities that to him the chief improvement of the early Berkshire was due, and that most of the old English herds of quality traced their ancestry to his herd. However, a number of other prominent English breeders of later date are mentioned as contributing largely to the improvement of the Berkshires.

Early importations of the breed were made to America, several being recorded as occurring between 1820 and 1835. However, it was not until nearly half a century after the first importations that the breed attained to general favour in that country. In 1875, the first, or American Berkshire Association, was organised, and in 1893 the National Berkshire Record Association was formed. Since that time the improvement of the Berkshire has gone on as rapidly, if not more so, in America as in England. This widespread interest, however, caused a natural rivalry between breeders in those two countries, and in some sections the somewhat larger and coarser English type is the favourite. As was natural, several types of this breed sprung up during the early improvement, but a good degree of uniformity was finally established, and while there are still coarse and fine types of this breed, they are all possessed of the same general characteristics which have made the breed popular with the American farmer.

The Berkshires are among the largest of the medium breeds. They are adaptable to a wide range of conditions, probably heading the list of the improved breeds in this respect. They possess great muscular power, and more than ordinary activity. They possess the quality of early maturity to an extent which enables the breeder to fatten them at almost any age desired, yet when properly fed for a longer term they will attain to great weight and size. They have limbs with bone of good quality, which, together with their activity, makes them exceptionally good grazers. They are hearty feeders, and as a breed have a strong digestive and assimilative power, which enables them to give a maximum return for the food consumed, although they are of a rather nervous and excitable temperament, and need careful and quiet handling for best results. They are possessed of strong prepotency, and on this account are of great value for crossing upon the coarser breeds. They are medium to good breeders, and their meat is of good quality, being generally firm and well marbled. A summing up of these qualities marks the Berkshire as an excellent pig for the improvement of common or coarse stock and a dividend-payer for the farmer who keeps a few pigs and feeds and cares for them well. That many farmers have found him such is evidenced by the wide distribution of the breed over the United States, Canada, and Australia.

Where this care and feed is insufficient, as is the case upon too many farms, there is some doubt about the superiority of so highly organised nervously active a breed, and there is probably a wide difference in the appearance of a Berkshire in condition and a scrub of the breed than between similar types of almost any other of the improved breed of pigs.

It is unnecessary to enter into a detailed description of the beautiful, glossy, black, finely marked Berks, with which every farmer is familiar who has noted them at our agricultural shows. Their broad, straight backs, well sprung ribs, deep fleshed loins, and heavy quarters, appeal to every lover of tender, juicy pork, while the general appearance of a good-conditioned and well groomed Berkshire is such as will leave a lasting impression upon the interested spectator.

RINGBARKING.

The following remarks on the subject of ringbarking, taken from Mr. J. H. Maiden's presidential address to the Royal Society of New South Wales some years ago, are interesting:—

"There is a vast field for inquiry into the best methods of destroying tree-growth. It is a matter of everyday knowledge that trees are sacrificed unnecessarily; but when it is decided what trees are to be destroyed, there is frequently serious trouble owing to the suckering of certain species (or the ground being taken possession of by others whose seeds have been lying dormant in the ground). The result, from whatever cause, is that ground is taken possession of by scrubby growths which have frequently become well-nigh impenetrable, and instead of ringing having resulted in an increased growth of grass, the reverse has been the case. So diverse are local conditions that it is impossible to prescribe with exactness the time for destroying trees in every district.

"If it be thoroughly understood that trees of different species do not perform their various functions connected with rest and growth simultaneously, and that our seasons are exceedingly irregular compared with those of Europe, on the recorded experience of which many of us rely perhaps too much, we shall have learned a good deal. And let it be further noted that we have a good deal of pioneer investigation to do yet—in other words, that when a man asks us the best time to ringbark a certain tree, we have frequently no precedent to offer him. Because stringybark was successfully ringbarked at Bandalgo in September one year, it does not follow that box may be successfully ringbarked at the same or any other place in September of another year. If we could prepare a column of statistics in this way, just as we record physical constants, what a boon it would be! No, we must approach this subject—the importance of which is still of such magnitude to New South Wales that outsiders can scarcely understand—in another way. We must consider the tree as a living organism, and give some attention to the physiology of tree-growth.

"The first thing is to ascertain when the sap is 'up' (to use a rather loose phrase, the meaning of which is, however, well understood), evidence of which is shown by the facility with which the bark strips, and also by the formation of leaves, to be noted at a distance by their greater greenness. (In Australia we have, of course, mainly to deal with nondeciduous trees, but nevertheless it is usually an easy matter for a careful observer to note the extent to which the formation of a new growth of leaves has extended, or whether the tree is at rest.) For an account of the physiology of the processes connected with sap movement I must refer to the text-books. But I may remind you that starch is contained in the sap of trees, or a substance from which starch is obtained. This starch is separated from the sap and is stored up, during the period of active growth, in the wood, and especially in the root-wood, ready for the formation of buds (usually leaf-buds), which buds usually burst in the spring, but the season of bursting forth is exceedingly variable in this colony with various trees, as I have already hinted. Every forester, every man concerned in the procuring of timber, and every pastoralist, should make and preserve records of the periods of 'flushes' of leaves on each of the various kinds of trees in his own district.

"Now, many trees, if the bark be injured or ringbarked, have the power of developing the latent buds which exist under the bark, which buds are developed by means of the store of starchy matter which we have already referred to as existing in the root-wood (and in the stump). In other words, we have 'suckers,' those curses of the forester and pastoralist. The liability of box (Eucalyptus hemiphloia, etc.) to sucker has passed into a bye-word. So here, as pointed out by Farrer and others many years ago, we have, I think, the key to the problem of ringbarking. If a tree is to be rung, see that the work is done properly, right through the cambium layer all round. Then see that it is cut at a period when the particular kind of tree operated upon has little or no starch or bud-sustaining material left in its roots. In other words, see that it is cut off from its base of supplies. Consequently, it may be bad practice to set a man to indiscriminately ringbark an area. Ringbarking is, in fact, an operation requiring scientific direction, and no landowner should turn a number of axemen into his property to ringbark without very cautiously directing their operations.

"It is a pity that the operation of ringbarking should be more difficult than is usually supposed, but we cannot contravene Nature's laws without taking the consequences. A favourite saying of Sir Andrew Clark to a patient, was, 'Remember that Nature never forgives.' If a landowner will pay no heed to the science of ringbarking, his pocket will suffer. If a public official directs or sanctions ringbarking at an improper season I would endeavour to teach him better, and if he proved incapable or unwilling to learn, I would replace him. If ringbarking were conducted on proper lines, that alone would justify the existence of a Forestry department, for it would result in enormous saving to private citizens, and to that great landowner—the State. Here we have another potent reason for the technical education of the Forestry staff."

FACTS ABOUT FLAX-GROWING AND MANUFACTURING.

Mr. H. Wolff, an authority on flax-growing, writing in *The Horticultural Gazette*, the journal of the Council of Agriculture in Tasmania, under the above heading, expresses the belief that Tasmania can and "will be the State in the Commonwealth in which this industry can be established and become a great factor in the wealth produced annually by the State, either as a locally-used article or an article of export." There is no reason why this industry should not be entered upon to a large extent in Western Australia with profit to the producer, and with the object of showing that such can be done the following extract has been taken from Mr. Wolff's article:—

"My reasons for saying that the industry is suitable are the following:—First: flax (*Linum usitatissimum*), although being a hardy plant which will thrive in all soils and climates, will succeed best in a temperate climate with an average rainfall of not less than 25 inches, and soils on which all manner of crops will succeed, from artificial grasses to root crops. I think that the island fulfils the above conditions to a nicety. Added to that there is the necessity of producing some highly nutritive food for dairy cattle which it will be necessary to feed during the winter months, and for this purpose probably no more valuable food exists than linseed cake.

"I believe that dairying could be carried on with great success in conjunction with flax-growing, on the principle of a few cows well fed at all times of the year.

"What land is the most suitable? Any land fairly free from noxious weeds, capable of being worked to a fine tilth, and good enough to grow a good crop of hay, grain, potatoes, etc., will grow flax equally as well. Newly-broken land, if worked fine, is preferable to any; stony land is good, but the crop will have to be pulled, which will pay well where it is possible to do so. The only land which is useless is swamp land which cannot be properly drained; when well drained, swamps will grow good fibre.

"Plough as often as necessary to kill weeds, and plough deeply—6 to 7 inches if possible; make the top soil very fine, sow the seed broadcast by hand or machine, taking care not to get the seed more than 1 to 1½ inches deep, and roll the land flat immediately after sowing. The rolling will help the tiny plants to resist the frost to a greater extent than open land. Besides leaving the land ready for the binder, it is possible to roll flax after it is well up, but not advisable. Sow 60lbs. of good seed on light land, and up to 85lbs. on very good land. The more seed that is sown, the finer and heavier will be the stem and the fibre produced. A light crop 3 feet high will yield 4cwt. of fibre, and a heavy crop up to 7cwt. of clean fibre; the value of which is £2 5s. per cwt. in the local market, and in Europe anything from £35 to £70 per ton, according to quality. Sow the crop early—any time between April and September—the earlier the better, to avoid the danger of caterpillars and dry spring weather; *but do not sow when land is very wet.* An ordinary drill, with the sowing-tubes removed, will do very well for broadcast-sowing; cultivators with seed-sowers attached are very good. Flax principally requires potash, which is contained in kainit; up to 4cwt. per acre being given on some land. Besides potash, the land should be well supplied with phosphoric acid, up to 1½cwt. superphosphate per acre being given; but in any case, manuring applies only to worked-out or poor land, and should not be a factor for the present. Practical and scientific researches in Europe have proved that although it is not wise to grow flax successively, it is possible to grow good crops several years running, with care and the right class of manures. Nine crops running were grown in Germany experimentally, but the custom is to grow flax before wheat; and it is claimed that flax invariably will leave the land in a perfect condition for wheat, on account of the roots of flax penetrating to a great depth, thereby loosening the ground. In addition, flax is a great destroyer of small weeds once above ground, and fairly thick it will smother anything growing. Should the crop look weak when a few inches high, about 50 lbs. of nitrate of soda sown on top will make a wonderful difference; but it is not safe to sow much of this foreign manure, else the crop may lie down.

"Where it is intended to cut the flax with binder, see that all stones and sticks protruding more than 2 inches about the surface are removed, to admit of the crop being cut within 2 inches of the surface. When the crop is growing, remove such weeds as wild turnips, charlock, thistles, etc.; it would pay to remove docks, but all the minor weeds can be worked out in the process of manufacturing.

"The crop is ripe when the stem has turned a bright-yellow colour and most of the leaves have fallen off; should the seed then not be ripe, it will develop in the stocks. Any crop not less than

2 feet 6 inches high can be cut with a binder, and thereafter turned into fibre with profit. Below 2 feet 6 inches, a crop would either have to be pulled by hand to be useful for fibre, or that not being possible, cut with a binder for seed only. To cut a crop of flax for fibre is worth 10s. per acre, there being heavy wear and tear on the machine, besides a loss of 2½ inches of fibre, which is worth another 10s. To pull a crop will cost 25s. per acre; at that price a good man can earn 6s. per day. It is therefore obvious that the monetary result of the two methods is much the same, only it is not always possible to get men enough to pull the crop; on the other hand, it is absolutely incorrect to say that cutting spoils fibre. This theory is advanced only by people who have not yet got away from the ideas of our forefathers, and the fact is that the large buyers will not give a penny more for the pulled article, unless the quality is better; and this applies *vice versâ*.

"Another erroneous idea is the supposition that good fibre cannot be made when the seed is taken off the straw. Fibre worth up to £75 per ton is made out of ripe straw, provided the crop has been grown as pointed out above—the stem finely grown. Fibre of much value cannot be made if only from 10 to 30 lbs. of seed have been sown. This is the secret. When crop has been cut or pulled, stook in long rows, sheaves two-and-two, with an occasional one outside to strengthen stook. When dry, stack in the usual way. Threshing can be done by hand where the quantity is small, or by means of a simple machine made by Cliff & Bunting, of Melbourne. The price is from £7 to £12, according to size. With these machines, two men can thresh 3 acres per day, with one man bringing on the sheaves and looking after the winnower, both machines being worked from a shaft driven by horse-works or light engine, about one horse-power being required.

"The value of the seed in large quantities, say hundreds of tons, used for oil purposes is £12 per ton, with reasonable rise for small quantities for seed, as high as £20 per ton having been paid for that purpose. The standard bushel of linseed is 56lbs. When the crop is threshed, the farmer's work is over, and the manufacturer's begins. The first process, now, is the spreading; that means, all the straight threshed straw is carted back to a grass or stubble paddock, and is there spread out, about 1 inch thick, in straight rows, to ret or rot. It is left for about three weeks, then turned over by means of a long stick, and left for another period of about three weeks, and at a certain time, determinable by an experienced hand, is gathered up when dry and taken to the flax-mill to be turned into fibre. The work just described is known as dew-retting flax. Seventy-five per cent. of all fibre produced is done in this manner, the balance being done by water and various chemical rettings, all of which are more expensive and more likely to result in loss. The dew-retting costs about 15s. per acre, of which we pay 7s. 6d. per acre for spreading—1 acre of grown crop will cover one half-acre of land, worth 7s. 6d. to spread; the other 7s. 6d. is absorbed for turning and gathering the crop.

"As I intend to deal with the manufacturing in another article, I will now close with the following suggestion to the farmers interested:—Let all do their best to harvest and spread out the small crops grown this season, and I will do all in my power to teach all who care to learn how to convert the crop into money; do not let the small annoyances, which are the result of pardonable ignorance of the subject, deter them from going on with preparing the land for next season. If given the opportunity, I will first of all give every assistance, and advise in getting a good area sown; and after the crop is harvested, I can already promise that I can find the company which will buy every acre of fibre grown in the State at an average price of £5 per acre for a crop 3 feet high approximately—less for shorter and more for longer crops; or, should this offer not tempt growers, I would make one of a co-operative company to manufacture all fibre grown in a given district. Both methods have been adopted in Europe.

"When stating that Messrs. James Miller & Company, of Melbourne, were highly pleased with the report I had to give of Tasmania's possibilities, and the positive assurances they gave me *re* buying all the fibre which would be grown in the Commonwealth for years to come at full market rates, I am only echoing what I said when speaking to farmers: that the industry is an unlimited one, and it will be many a long year before we reach the limit of our own market, even if it should be necessary to adjust the tariff to suit our conditions. At present we are asked to compete with the cheapest countries in the world, and our natural advantages will almost enable us to do that; in any case, a one-million market is ours, and we will find a way to keep it."

THE GOVERNMENT LABOUR BUREAU.

REPORT FOR MARCH.

Mr. J. B. Hitchins, Acting-Superintendent of the Government Labour Bureau, has forwarded to the Minister for Labour the following report on the work of the bureau for the month of March, 1905:—

PERTH.

Registrations.—The total number of men who called during the month in search of work was 880. Of this number 595 were new registrations and 285 renewals, *i.e.*, men who called who were registered during the months of January and February. The trades or occupations of the 880 applicants were as follow:—Labourers 275, handy men 67, handy boys 65, farm hands 58, cooks 30, bushmen 46, carpenters 27, horse-drivers 21, hotel hands 19, gardeners 17, blacksmiths 14, grooms 14, painters 12, dairymen 11, miners 11, kitchenmen 10, plumbers 10, yardmen 8, bricklayers 7, clerks 7, orderlies 7, station hands 7, fitters 6, butchers 6, engine-drivers 6, survey hands 5; bakers, married couples, strikers, stewards, and waiters, 4 of each; and 75 miscellaneous.

Engagements.—The engagements for the month totalled 291. The classification of work found was as follows:—Labourers 85, farm hands 38, bushmen 34, handy boys 28, woodcutters 16, handy men 17, cooks 11, carpenters 7, gardeners 5, kitchenmen 5, boys for farms 4, teamsters, horse-drivers, dairymen, and yardmen, 3 of each; bricklayers, brickmoulders, carpenters (rough), miners, and married couples, 2 of each; and 19 miscellaneous.

FREMANTLE.

Registrations.—The applicants for work numbared 263. There were 224 new registrations and 39 renewals.

Engagements.—The engagements numbered 39, classified as follows:—Labourers 26, handy men 5, bushmen 3, farm hands 2, handy boys 2, and waiters 1.

KALGOORLIE.

Registrations.—The new registrations for the month numbered 78 and the renewals 24.

Engagements.—The engagements numbered 10, classified as follows:—Labourers 3, handy men 3, engine-drivers 2, and wood cutters 2.

CUE.

Registrations.—The applicants for work numbered 4.

Engagements.—*Nil.*

WOMEN'S BRANCH, PERTH.

Registrations.—There were 232 women called in search of employment, 154 being new registrations, and 78 renewals.

Engagements.—The engagements numbered 99, classified as follows:—Generals 41, laundresses 25, useful girls 8, cooks 7, light generals 5, charwomen 3, lady helps 2, laundry housemaids 2, and 6 miscellaneous.

WOMEN'S BRANCH, FREMANTLE.

Registrations.—The women who called during the month numbered 18. There were 17 new registrations and one renewal.

Engagements.—Work was found for two.

KALGOORLIE.

The female servants who called at the men's branch numbered 12. There were no engagements.

GENERAL REMARKS.

At the central office, Perth, 880 men called during the month in search of work. This total is 41 in excess of the total for February and 223 in excess of the total for March last year. The engagements numbered 291, viz., 195 for country districts and 96 for town; this total is 92 in excess of the total for February and 61 in excess of the total for March last year. The total number of registrations for quarter ending March 31, 1905, is 1,960 against 1,392, or 568 more than for the corresponding quarter of last year. The engagements for the same period are 681, against 562, or 119 more. Of the 681 engagements, 617 were from work supplied by private persons and 64 from Government departments. A large proportion of the 1,960 applicants for work are not a settled portion of the city population, and 73 per cent. are single men. Some of the married men's families are not in this State. A number of the applicants are new arrivals, mostly from the Eastern States; some of these, after registering, did not call again, and it is supposed that they have left for the goldfields and country districts in search of work. There are some who might be termed regular callers at the bureau, who do not seem disposed to accept work of a permanent nature, but to be content with odd jobs, whilst there are others not physically fit to do a fair day's work, and there is some difficulty in finding them suitable employment. It is interesting to note that many new arrivals make straight for the bureau, and are usually ready to accept what work is offering in town or country. At the men's branch, Fremantle, there were 678 registrations from 1st January, 1905, against 380 for the same period of last year. The engagements for the same period are 58 (26 were from work supplied by Government departments), or 13 short. At Kalgoorlie the registrations numbered 257, against 182, and the engagements 71, against 40. At Cue the applicants for work numbered seven, and there were no engagements. At the women's branch, Perth, the women who applied for work during the quarter totalled 528, against 406, or 122 more than last year. The engagements for the same period are 284, against 207, or 77 more.

QUARTERLY RETURNS.

Following the custom adopted for some time, quarterly returns from magistrates, police officers, secretaries to labour organisations, and others have been received, and the returns to hand show the condition of the labour market throughout the State for quarter ending 31st March, 1905.

At Southern Cross, Coolgardie, Kalgoorlie, Boulder, Kanowna, Menzies, Mount Margaret, Yalgoo, Mount Magnet, Day Dawn, Cue, Peak Hill, Collie, Geraldton, Greenough, Dongara, Mingenew, Northam, Meckering, Doodlakine, Bunbury, Donnybrook, Yarloop, Pinjarra, Jarrahdale, Waroona, Bridgetown, Toodyay, Busselton, Guildford, the supply of all classes of labour is sufficient.

At Perth there is some demand in the building trade for good tradesmen. A number of unskilled labourers are unemployed. There is a slackness of employment in most trades.

At Southern Cross mining is very quiet at present, but the community there are full of confidence for the future.

At Kalgoorlie and Boulder there is some demand for bricklayers and masons. A good number of miners are out of work.

At Kanowna matters generally are in a settled state. There very few unemployed in the district; any vacancies that occur, however, are quickly filled.

At Yalgoo there is a slight demand for miners. The supply and demand are about equal.

At Day Dawn there are a number of miners out of work.

At Collie mining is at present under depression, and, consequently, other trades suffer. A good many men are sleeper-cutting, but the timber is scarce within reach of the railway.

At Yarloop there is some demand for unskilled labour at present. The timber trade is brisk. Two good-sized drainage contracts are being carried on.

At Jarrahdale the majority of the residents are employed in the saw-mill industry. The demand for labour fluctuates according to the demand for timber, but it seldom happens that able-bodied men who are willing to work are unsuccessful in obtaining remunerative employment.

At Bridgetown and Waroona the demand for good farm labourers is greater than the supply.

At Southern Cross, Coolgardie, Kanowna, Collie, Northam, Pinjarra, Albany, Greenough, Dongara, Bridgetown, Northampton, Toodyay, Bunbury, and Yarloop the demand for female domestic servants is greater than the supply.

APIARY NOTES.

By JOHN SUTTON (Bee Expert).

Notwithstanding the great havoc the season of 1903-4 made in the number of colonies of bees in this State, the season just closing has more than recouped most of the up-to-date apiarists. Almost anywhere in the South-West districts the bloom of the many honey-bearing forest trees have been remarkably good from a beekeeper's point of view, and the general average yield has given a good surplus of honey, equal in quality to any produced in the Commonwealth.

There has been, however, some exception, notably in the district of Albany, where the yield has been below the general average. While this district, with the abundance and great variety of flora, would seem to be an ideal spot for the bee-keeper, the climate is subject to so many sudden changes; showery weather and chilly nights being common; that hence to succeed with bees it is almost imperative that every colony should be kept strong. This, I regret to say, proves the exception instead of the rule.

For numbers of people keeping bees within a given area, the Albany district is far away ahead of any other part of this State, but, unfortunately, all people keeping bees are not bee-keepers, and in the case in point the great majority are, in reality, a menace to the real lover of bees. Box-hives and home-made frame hives, badly designed and badly made, prevail, and but little care or attention is paid to keep the stocks in order or condition, with the result that chilled brood and sundry diseases are to be found, and the whole district is now in jeopardy. Foul brood, the most serious disease, threatens not only those with a few uncared for colonies, but also those who are endeavouring to make bees a success.

The disease has in early days swept whole districts and cleared apiaries. It has no terrors for the up-to-date apiarists to-day, provided they give proper and undivided attention to their stocks, because experience gained from careful experiments has demonstrated that the disease is easily kept in check, and, if taken in time, almost as easily cured: this, however, is only applicable, where the bees are in proper hives, and are kept in normal condition.

Cleanliness is one of the first considerations, and in most cases the want of this may, *nay is*, responsible for the present condition.

Make all stocks strong and robber-proof, change all bees into clean hives and frames, and see they have an abundance of proper food now the winter is approaching, otherwise it were better to destroy the lot.

LIZARDS.

To show how the lizard may be a friend to the apiarist, I will describe a few instances. For two or three months last summer there was a lizard which came into the house regularly between noon and 1 o'clock to catch flies and ants from the floor. There was a very industrious nest of ants located about 30 feet from the house, which formed a black line of foragers to the porch, and went up one of the porch posts and down a wire into our wire-screened safe for fruit. I put tar on the wire, and then they marched in across the kitchen floor to a can of honey that was there for use on the table. Whenever honey was drawn into a dish a little would stick to the cap, and thus attract the ants. I noticed that when the lizard caught a fly, it always turned and picked up from two to four ants, so I made him welcome. At the end of five or six weeks the ants seemed to be entirely cleaned out.

At another time an open five-gallon can of granulated honey was set on the stove to melt. A coarse cloth was thrown over it to keep robber bees out. The honey boiled up suddenly on one side and oozed through the meshes of the cloth. As I was at the dinner-table at the time, the honey was set off the stove on the floor a few feet from my chair, and about a dozen flies and five or six robber bees pounced upon the oozed honey at once. The lizard came in as usual, and immediately hopped upon the cloth among the bees and flies, and, after catching a dozen flies and not molesting a single bee, it climbed down as quietly as it came in and disappeared out the door.

Although these lizards eat house-flies and ants, yet they prefer the larger fles, spiders, cockroaches, crickets, moths, canker and cut worms, and grasshoppers, all of which I have often seen them catch.—Writer in *Gleanings*.

UNFINISHED SECTIONS FOR STARTERS.

Regardless of what some good authorities claim about being able to have bees start as readily on comb foundations as in unfinished sections that have been nicely cleaned up and carefully stored away, my own experience teaches me that the unfinished sections are away ahead in inducing the bees to enter the sections early and commence storing honey therein, and while I am unfortunate in not having had each section completely filled out the past season, I feel somewhat fortunate in having on hand a good supply of these unfinished sections ready for use when the honey flow comes next season. Young man, take good care of the unfinished sections; have them nicely cleaned up by the bees and store them away carefully for next season's use. They are good stock in trade, and whenever anybody tells you otherwise don't you believe it.—*Progressive Beekeeper.*

THE USE OF SMOKE IN HANDLING BEES.

In passing from apiary to apiary I am surprised to see how differently men use, or misuse smoke, when handling bees. Some men even ask me if I ever "smoke in the entrances?" As a rule, such men will jar the hives in taking off the cover, then pry or pull off the super with a snap. About this time the bees, angry bees, begin pouring out at the entrance and from the top of the hive, and then the bee-keeper begins to use the smoker; but the bees are mad now, and no amount of smoke will pacify them. The most important place to use smoke is at the entrance, and it should be used there as the *first step* in opening a hive.—*Australian Bee Bulletin.*

NATURAL DISINFECTANTS.

In *Le Rucher Belge*, M. Reidenbach propounds new ideas with respect to disinfection of hives. He says it is well known that bacteria are the cause of a great deal of mischief in hives, but these are, in a measure, protected from the depredations of these microbes by the formic acid, tartaric acid, and ethereal oils in the nectar. Formic acid in small quantity is found in the poison of bees, but exists in much larger quantities in the larvæ, and in combs that have been bred in. He was able to extract from a piece of comb weighing 41 grammes about 36 milligrammes of formic acid. He found none in virgin comb. He concludes that the object of this acid is to preserve the nitrogenous food of the larvæ, and, consequently, to prevent fermentation and resulting disease. Damp prevents the evaporation of this disinfectant, and predisposes colonies to disease; therefore it is important to secure good ventilation so as not to deprive the hive of its weapon against bacilli. Another means of disinfection is in the tartaric acid found in the headglands, which for a long time were supposed to contain formic acid. M. Reidenbach's research has shown this to be so, for formic acid is very volatile, and is rapidly dissipated in the air, but he found appreciable quantities of acid in the dry royal-jelly several years old, which showed it to be not formic but tartaric acid. This not only inverts cane sugar, but is of greater importance in the food of larvæ, as it changes by oxidation into formic acid. A third means of disinfection is in the ethereal oils found in honey. It is these that produce the aroma that escapes from a hive during a rapid ingathering, or that attract the bees to the flowers, and give to the plants like fennel, mint, and thyms their healing virtues. Their action in a colony is inestimable, and they assist in preparing a healthy food, and, while arresting the development of bacilli, give vigour to the colony. An active and vigorous colony produces a large quantity of formic and tartaric acid, and with a rapid flow of nectar, the ethereal oils increase, and the bees are in good condition to defend themselves against foul brood. He concludes by advising the bee-keeper to look after the sanitary conditions of his hives, to be sure that they have proper ventilation and good food; in fact, that they should be in a state to always produce the natural disinfectants to maintain the colony in a healthy condition.—*British Bee Journal.*

NOTICE.

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SENSE OF SMELL IN BEES.

"Any one who has observed bees has seen that they are guided very largely in their movements by the sense of smell," writes Prof. E. F. Phillips in *Gleanings*. "Bees have been known to fly a mile or more over water to reach flowers on an opposite bank toward which they could be guided only by scent.

"The celebrated naturalist, Huber, first discovered that the organs of smell in the bee are located in the antennae, and he performed some interesting experiments by cutting off the antennae, thus depriving the bees of their power of detecting odours. I have recently repeated some of his experiments on workers, drones, and queens, with some modifications, and all my results confirm his position.

"Concerning the queen, Huber says: 'When one of her antennae is cut off, no change takes place in the behaviour of the queen. If you cut off both antennae near the head, this mother, formerly held in such high consideration by her people, loses all her influence, and even the maternal instinct disappears. Instead of laying her eggs in the cells, she drops them here and there. As is well known, a young virgin queen is normally accepted without any difficulty by any colony which has been queenless long enough to know its queenless condition. In experimenting along this line I cut the antennae from a virgin queen about three hours old, and put her on the comb of an observatory hive, and she was. at once balled. This was repeated with another hive. She was rescued from the workers and confined in the hive in an introducing cage containing candy, but in a short time died, probably of starvation, for I am sure she was not stung by the bees in the ball, for she was taken out at once, and I never lost sight of her. Although there was candy in her cage she evidently did not recognise it as food, since she was not attracted to it by smell, and on account of the loss of her antennae she was not fed through the meshes of the wire cloth.

"When the workers are deprived of their antennae they remain inactive in the hive, and soon desert it since they are attracted only by light. I cut the antennae from several workers and marked them on the thorax to make it more easy to follow their actions, and then put them in an observatory hive from which they had been taken. The other bees at once recognised that there was something wrong with them, and gathered round them much as they surround the queen, and repeatedly tried to feed them; but the injured workers could not guide their tongues, and consequently did not take food readily. One worker with its antennae off was put on the alighting board of its own hive, but was at once repelled and carried away by one of its own hive mates.

"Drones act in a very similar manner, but are frequently rejected by the workers as soon as they are put in the hive. Huber reports that as soon as the light was excluded from the observatory hive, although it was late in the afternoon, and no drones were flying out, the drones from which the antennae had been cut deserted the hive, since light was the only thing which attracted them.

"From these observations it seems clear that the bees recognise each other very largely by scent, but also by touch. The workers and drones operated on were returned to their own hive, and we would suppose that they retained the odour of that hive; but since they were not able to extend their antennae to the other bees they were at once recognised as differing in some way, and received different attention. Langstroth says of these experiments: 'The inference is obvious that a bee deprived of her antennae loses the use of her intellect'; but this statement should be modified somewhat, for the intellect is in no way influenced by the operation. The bee continues to respond normally to all sensations which it has the organs to receive, for we see that light still attracts as it did before; but on account of the one-sided reception of stimuli its actions become abnormal.

"It yet remains to be seen which segments of the antennae receive certain odours, for probably they are not all alike. It has been found in ants that the different segments of the antennae perceive different kinds of odours, and the same is very probably true of bees."

GARDEN NOTES FOR MAY.

By Percy G. Wicken.

Those settlers who have got their ground prepared and manured should be able to raise some exceptionally early vegetables this season, both for their own use and for market purposes, as the plants will be able to get a good start before the cold weather sets in. The compost heap should now come in very acceptable, as a liberal supply of manure will be required. A compost heap should be made on every farm. All vegetable matter and rubbish that will decay may be placed on it, together with all ashes and bones from the kitchen and the cleanings up of the fowl-yard, pig-sties, etc. This, in the course of a few months, will accumulate into a good-sized heap, and will help very considerably to reduce the bill for artificial manures. Drainage is another matter that will require attention. We shall soon have plenty of wet weather, the ground will become waterlogged, and plants will not flourish in stagnant water; and unless the ground is naturally drained by a gravelly subsoil, steps should be taken to keep the water moving, either by a system of underground drains, constructed of agricultural pipes for preference, or else of stones, slabs, poles, or other suitable cheap material, or by good open drains on the surface. The underground drains are much to be preferred, as they are not in the way of the implements used to cultivate the soil, and also by drawing the water through the ground they cause the air to penetrate through the pores of the soil, which is thus sweetened or aerated. Artificial manures, if used for the garden, should not be put too deeply in the soil; they should be applied near the surface, or better still, in the form of a liquid manure when the plants have obtained a root-hold.

ASPARAGUS.—Dig a trench about 2ft. deep and throw out the top soil on one side and the subsoil on the other, place the soil back in the same order as it came out, the subsoil at the bottom, mixing thoroughly with good stable manure as you do so, and the bed will then be ready for planting out in the Spring.

BEANS (Broad).—A farther supply of this vegetable may be sown this month. They should be sown in drills from 3ft. to 4ft. apart. If the flowers on these plants do not set, it is a good plan to pinch off the top of the plant, which will often cause them to bear heavier crops. In small gardens it is better to plant these in rows six feet apart and plant a row of cabbages or cauliflowers between.

BEET (Silver).—A few plants may be sown to keep up a succession.

BRUSSELS SPROUTS.—Are very little more trouble to grow in a cool district than cabbages, and are treated much in the same way. They make a splendid vegetable and are a welcome change. They require a liberal supply of good liquid manure to force them along.

CABBAGE AND CAULIFLOWER.—Plant out all the young seedlings that you have available, and if no plants are ready the seed can be sown in drills and the young plants thinned out when a few inches high. These plants form the standard crop for the vegetable garden, and can be fallen back on whenever other vegetables are scarce and any surplus supply will be relished by the stock on the farm.

CARROTS.—Sow a good supply for home use. If you have any to spare they will do your horses good.

CELERY.—Plant out in a well manured trench all the young plants you have and keep hilling them up as they grow so as to keep them thoroughly bleached.

LEEKS.—Sow a liberal supply of this wholesome vegetable. They are easy to grow. They are best raised in a seed bed, and when about six inches high, plant out in trenches in well manured ground.

ONIONS.—Sow a good supply of this vegetable; they are always useful and any surplus supplies can be readily sold. They require a very fine well-worked sandy loam soil, and will well repay the attention given in thoroughly working the ground. The expression "As fine as an onion bed" is a well known saying. They will also require well manuring with a good supply of well rotted manure. It is cheaper to raise the seeds in beds and plant out later on, as by this means they are enabled to get a start of the weeds. They should be planted in rows about 15in. apart and from 4in. to 6in. apart in the rows.

PARSLEY.—A little seed may be sown.

PARSNIP.—A few rows may be sown to keep up a supply.

PEAS.—May still be sown, the earlier sown ones should now be well forward, and, if of the climbing varieties, will require staking. Staking peas and training them is a little more trouble than to allow them to run all over the ground, but the increase in the yield will more than repay for the trouble.

TURNIPS.—A few more rows may be sown, and those already up will require thinning.

FARM.—The early fall of rain at the end of March should prove of great advantage to new settlers as it will enable them to start ploughing earlier than they are usually able to do, and thereby get their land in good order to sow their crops early. During April this year, ploughing on the new ground will be in full swing; this work is not generally able to be done until May, and the bulk of the sowing will be able to be done at the end of April or early in May. The early sown crops within limits nearly always do best. In many crops smut was very prevalent last season and to prevent this from spreading all seed should be pickled in a solution of bluestone and water, the strength being 1lb. of bluestone to five gallons of water, the wheat being dipped in the solution for from four to five minutes and then drained and allowed to dry before sowing. Another method by which to prevent smut is to dip the grain in water at a temperature of 132° F. for two minutes. The earlier the crop is sown the less quantity of seed is required per acre, as the plants have a better opportunity to stool out than those sown later on. From three-quarter to one bushel per acre is the best quantity to sow. All settlers should carry out a few experiments with manures for themselves and thereby endeavour to find out which manures suit their soils best; but to obtain definite results very accurate accounts must be kept, both as to the area of ground sown and the amount of crop obtained, and also as to the cost of manure and the cost of producing the crop.

COLONIAL WOOL SALES.

THE MARCH SERIES.

The second series of colonial wool sales for the current year opened in London on 7th March. Dalgety & Co., Limited, give particulars of the quantities available, as follows:—

	Old Stock. Bales.	Net Available. Bales.	Catalogued 7th March. Bales.
Victoria	1,500	17,300	805
New South Wales	1,200	39,200	1,467
Queensland	500	19,000	3,052
South Australia	300	9,700	294
West Australia	300	11,400	1,690
Tasmania	100	900	42
New Zealand	600	75,000	4,263
Australasia	4,500	172,500	11,613
South Africa	500	7,000	340
Total	5,000	179,500	11,953

to which must be added about 2,000 bales of Falkland Islands and 8,000 bales of Punta Arenas.

The quantity available is rather in excess of our cabled total, owing to a subsidiary manifest of a late New Zealand steamer, which did not come to hand until after the list was closed and figures made up.

There was a good attendance both of home and foreign buyers, and competition, though a little hesitating, was, on the whole, fairly good.

The few good greasy merinos offered showed little change in values, but faulty and earthy greasies, as well as the bulk of faulty scoured, were mostly about 5 per cent. lower. Fine crossbreds made late rates to 5 per cent. decline, but medium and coarse sorts sold somewhat irregularly at 5 to 10 per cent. below the closing rates of last series. Finest merino lambs' wool, when free from fault, showed little change, but burry, seedy, and wasty descriptions were 5 to 10 per cent. lower.

All good merinos met with a strong demand at full prices, but seedy and burry sorts, of which there was an ample supply, showed no improvement in value, and some of the shorter, more faulty, and earthy descriptions had to be withdrawn owing to the low offers made. Buyers state that the yield of these wools has been most deceptive, and that they have lost heavily through this cause in their purchases last series. Crossbreds sold with good competition at full opening rates.

We consider that the heavy arrivals of wool purchased in the colonies on consumers' and dealers' account have a tendency to somewhat restrict competition at auction, and that when these wools have passed into consumption we may, so far as merinos are concerned, see an advance, but as the bulk of the supplies of crossbreds has still to come forward, we think a maintenance of present values will be the most that can be expected.

Messrs. Helmuth, Schwartze, & Co., state that the quantities for the remaining series for the year have been fixed as follows:—

May 2.—150,000 net arrivals.

July 4—150,000 net arrivals.

September 19.—No limit as to quantity.—*Morning Herald.*

LOCAL MARKET'S REPORTS.

H. J. WIGMORE & CO.'S REPORT.

Messrs. H. J. Wigmore & Co. report as follows in connection with their daily sales of produce, held at Perth and Fremantle, for the month ended 8th April, 1905:—

In our last report we drew attention to the fact that supplies from farmers had considerably shortened, and that prices had made a decided rise, especially during the latter part of the month. This shortening tendency has been maintained since our last report, and prices have firmed in sympathy. For the week ended 7th inst. 59 trucks chaff only were forward for auction, as compared with 108 trucks the previous week. From time to time we have advised our farmer friends of this increase in price, and we repeat that present rates will strongly be maintained, with a still firmer tendency. At the present prime, green, well-cut wheaten chaff should realise £4 10s. per ton, whether at Perth or Fremantle, as £4 5s. is readily obtainable for f.a.q. Good medium wheaten has even realised up to £4 2s. 6d. With the exception of those who bought considerably during the recent glut, buyers in the Perth railway yards are showing anxiety to secure supplies to carry them on from day to day. We do not think top figures have yet been reached, and stored chaff is not at all likely to be placed on the maket for at least another two months at the outside. We do not even then think that prices will ease, as we are satisfied that there is not much prime quality stuff left in the country. We do not think we are far wrong in stating that higher prices will be realised during the next three months than obtained for the corresponding period of last year. Of course, several of the Perth buyers who secured supplies for storage purposes during the glut are unloading a certain quantity, which, however, cannot be large; but this unloading only takes place when the supplies to various agents at Perth are very small. Our prognostication of last month that prime chaff would see £4 10s. during April, we think, will very shortly be realised; and we will go further and say that £5, we think, will be touched during May—the limit realised last year.

Wheat.—We reported last month strongly advising our clients not to forward their prime quality to Perth or Fremantle at that moment. The price secured this week has borne out our advices, as we have secured readily 3s. 8d. for prime quality during the week, and have sold very considerable parcels on that basis for prompt delivery, and above for forward. We are inclined to think that, with the advent of the Perth Roller Flour Mill, prime milling wheat will not find its way into produce merchants' stores. For fowl corn we contend that consumers will have to be satisfied with smutty, inferior, and pinched qualities. Of course the lower grades can be secured relatively cheaper than prime milling, and, with a good demand in Perth from the mill, fowl corn cannot possibly be represented by prime milling wheat. We anticipate that wheat will reach even a higher figure than 3s. 8d. before the season is out.

Oats.—As reported last month, local Algerians are practically not in evidence, only one truck being forward for some considerable time, and this was sold at 3s. 5½d., Perth. Supplies continue to be secured from Victoria, and prices remain on the same level as reported during March. We still contend that firmer prices may be looked for before long, and as cheap freights have discontinued, for a time at least, they do not now play their part towards reducing spot quotes. F.A.Q. Victorian Algerians are now worth up to 2s. 6d. whole on rails, Fremantle, and an extra 1½d. per bushel for crushed.

Hay and Straw still continues in poor demand, and we have no business to report. Consignments of straw have been above requirements lately, and the price, according to buyers' ideas, has declined, but £2 per ton on rails, Perth or Fremantle, is still asked by agents, although this price has not been secured for some few weeks. As soon as the rains become general we anticipate straw being in better demand.

Bran and Pollard.—The local mills still continue to fill daily wants up to a point. Since the arrival of the cheap freight boats, however, little bran has come forward from the East, and, with the general rise in Sydney, Melbourne, and Adelaide, buyers on spot have contented themselves with spot purchases, very few orders, if any, going to the East for forward shipment. We have sold considerable parcels during the past month at up to £5 15s., f.o.r., Fremantle. Northam has reached £6 per ton, deliveries to the goldfields. Notwithstanding the general rains in the East, we do not anticipate a decline in price at present, as the mills are not working full time, very little flour going to oversea ports, and therefore wheat offal is not in heavy production.

Flour.—We have no change to report in connection with the price for Thomas & Co.'s Northam flour. We still continue to quote £8 15s. sacks, £9 quarters, on rails, Northam, and are still continuing to make daily sales.

PATERSON & CO.'S REPORT.

Messrs. Paterson & Co., Fremantle, report for the week ending April 8th, as follows:—

Chaff.—This past week has shown a sharp rise in the price of chaff of f.a.q. and prime. The market has been poorly supplied, and produce merchants' stocks have had to be heavily drawn upon. Reports from the country also show that farmers are looking for a still further increase, and any buyings for forward delivery are quoted at 10s. above the present market prices. Whether the whole of this increase has been justified remains to be seen. To-day only four trucks of wheaten chaff were forward, which sold at £4 5s., £4, £3 17s. 6d., and £3 12s. 6d. Of two trucks of oaten, one sold at £3 12s. 6d. and the other passed in. Two trucks of mixed oaten and wheaten sold at £3 10s. With the exception of the chaff at £4 5s., the others were only of from good quality to medium. We think that farmers should to a certain extent take advantage of present prices, as it has before happened that a market of this sort has overshot the mark, and prices have not justified their holding for more. Oaten chaff is still easy at £3 12s. 6d. for f.a.q., with an occasional very prime truck realising £4.

Oats.—Melbourne quotes Algerians from 1s. 7½d. to 1s. 9d. (equivalent to 2s. 5½d. Perth) for stout feed. Locals have not been seen to any extent this year, the market having heen well supplied from Victoria at values which have not been acceptable to farmers here.

Stout feed Tasmanian oats, guaranteed four-bushel bags, are quoted at 2s. f.o.b. Devonport, equivalent to 3s. on rails, Perth; but the inquiry is not strong, Algerians now taking the place of white oats in nearly all instances.

New Zealand B-grade oats quote at 2s. 4½d. c.i.f., or 3s. 2d. on trucks, Fremantle. Demand weak.

Wheat.—London cables advise value at 32s. per quarter, with a tendency in favour of buyers. Melbourne and Adelaide markets are a shade easier during the last few days, the quotes now being 3s. 3½d. f.o.b. at both ports, with a weakening tendency. Our local market is firm at 3s. 8d. for prime quality on rails, Perth, which is the highest price so far for this season. Smutty qualities are realising from 3s. 5d. to 3s. 6d., according to quality.

Barley.—None has been offered during this last week. Prices are nominally 2s. 11d. for prime Cape.

Bran.—This is quoting at £6, Northam, for local, and £6, Fremantle, for imported. The demand has been extremely heavy, but since the advent of rains in the Eastern States values have shown a tendency to drop, especially in New South Wales. Prices there fell from 9¼d. to 8½d. The advent of a steamer loading for South Africa has again firmed prices, and they are now quoting at 9¾d. for April delivery—equivalent to £6, Fremantle.

Pollard.—Pollard is easy, the local market having dropped fully 5s. per ton, strenuous efforts having been made to supply a strong demand a fortnight ago, with the result that the market at present is slightly overstocked. We quote £5 12s. 6d. on rails, York or Northam. Imported pollard has been unknown for the last few weeks, values in the Eastern States being impossible for this market, Sydney quoting 11d. and Adelaide 1s. per bushel.

Straw.—The demand is weak at present for ordinary baled straw, only prime samples of long straw being inquired for, at £2 2s. 6d. on rails, Perth.

Flour.—We quote £8 14s. on rails, York, for Messrs. Harvey & Edwards' No. 1 quality.

DALGETY'S MONTHLY REPORT.

Messrs. Dalgety and Co., Ltd., report as follows in connection with their daily sales of produce held at Perth and Fremantle during the month ended 10th April:—

Wheat.—London market is weaker at 32s. per quarter of 480lbs c.i.f., which is a decline of 9d. per quarter since our last monthly report. Melbourne and Adelaide markets are also weaker at from 3s. 3½d. to 3s. 4d. per bushel.

Local Wheat:—Local wheat is in good demand in the country at from 3s. 4d. to 3s. 5d. per bushel, f.o.r. country stations, at which price fair sales have been made. Comparatively speaking, there is not much wheat offering in the markets, country holders at the present time not being anxious sellers, in fact farmers' holdings are now inconsiderable. Stocks in the Midland districts have now almost run out, and buyers must draw supplies from elsewhere. Perth and Fremantle markets have shown a considerable improvement during the last month; we consider the markets are from 3d. to 4d. better. There has been good speculative inquiry from Perth and Fremantle buyers, but so far, limited business has been transacted, holders not being prepared to meet the market just yet. Supplies coming forward to Perth and Fremantle have been light, and prime milling wheat is worth 3s. 8d. per bushel, smutty samples 3s. 6d. Our Kalgoorlie branch have also made fair sales of wheat during the last month, having placed fair parcels at prices ranging from 3s. 4d. to 3s. 5d. per bushel country stations. Farmers would do well not to hold wheat too long.

Chaff.—At this time last month consignments of chaff to Perth and Fremantle were very light, and prices for prime samples were firm, although other grades were not in such good demand. A fortnight later, supplies to Perth and Fremantle increased, and the market was correspondingly weaker, in fact prime chaff receded from £4 5s. to £3 15s per ton. At this latter price the market remained for a short time, and now a further decrease in daily consignments has been responsible for a sharp rise to £4 5s. per ton, at which price the market is now very firm with a strong upward tendency. Owing to light arrivals at Perth and Fremantle, particularly the latter centre, stored stocks have been liberally drawn upon during the last few days, and a continuance of the present rate of arrivals must shortly cause a further advance in these markets, particularly as they are not quite in sympathy with Northam values, Northam market being very firm to-day at £3 15s. and £4 per ton, and latest advices indicate a further rise. Ruling rates at Perth and Fremantle are as follows: Prime green wheaten chaff, £4 5s. per ton to £4 7s. 6d. per ton, firm demand, light supplies; f.a.q. wheaten, from £4 upwards, light supplies, good demand; medium wheaten, from £3 7s. 6d. per ton upwards: inferior wheaten, from £2 17s. 6d. per ton.

Oaten Chaff.—No prime oaten chaff forward to Perth or Fremantle. Good sound oaten, from £3 7s. 6d. to £3 17s. 6d. per ton.

There is a strong speculative inquiry in the farming districts, and during the last few weeks large quantities of hay have passed from farmers' to speculators' hands; this gradual concentration of stocks, together with the advent of wet weather, must tend to maintain an even temporarily improved price. We have also made heavy sales of chaff privately at full market rates. At Fremantle the daily arrivals of prime chaff are far short of the demand, and we can recommend consignments to all centres, particularly Fremantle. Several holders of chaff, who are not able to cart in the winter, but who prefer to risk the market, have arranged to send consignments to us to be stored and sold in May. We have still a limited amount of storage space available at Perth, and farmers intending to take advantage of these facilities might do well to book at once.

Algerian Oats.—Melbourne market is weaker at from 1s. 7½d. to 1s. 9d. per bushel. Fremantle market is easy at 2s. to 2s. 7d. per bushel, f.o.r.

Seed Algerians.—We have to report sales of 1,200 bags during the past month at from 2s. 10½d. to 3s. per bushel.

Barley.—"Cape" barley is in good demand. We have also a fair inquiry for "skinless" and "malting" seed barley.

Straw.—We cannot recommend consignments for auction. We sold several parcels of straw privately at £2 2s. 6d. per ton, Perth and Fremantle.

Pressed Hay.—We cannot recommend consignments to Fremantle, as accumulated stocks are still very heavy.

KALGOORLIE.

Throughout the past month Kalgoorlie market has been short of chaff, and the demand in that centre is very keen, prime grades being particularly scarce. Ruling rates are as follow:—

Prime green wheaten chaff, from £5 5s. to £5 10s. per ton. One special truck was sold during the week at £5 12s. 6d. per ton. Good green wheaten, £5 per ton. Medium quality, £4 15s. per ton. The chaff market closed firm.

SKIN AND HIDE REPORT.

Messrs. Dalgety and Co., Ltd., report having held their usual weekly sale on Friday, April 7.

Sheepskins.—Supplies were fully up to the average, and owing to favourable news from London very keen competition was experienced, values generally being from ⅛d. to ¼d. per lb. higher. Good merino, half to three-quarter wool, 6½d. to 6⅝d.; medium merino, half to three-quarter wool, 6¼d. to 6⅝d.; good merino, quarter to half wool, 6½d. to 6⅝d; medium merino, quarter to half wool, 5½d. to 6d.; fine crosbred, quarter to half wool, 6d. to 6½d; coarse crossbred, quarter to half wool, 5½d. 5¾d.; pelts, merino and crossbreds, 5d. to 5¾d.; pelts, shearlings, 4½d. to 5d.; lamb pelts, 5d. to 5½d. In all cases where pelts of above are sun-dried, weevil-eaten, torn, or perished, prices are from 1d. to 2d. below quotations. We are in receipt of the following cablegram, dated 7th instant: "Sheepskins, merino and fine crossbreds, higher by ¼d. per lb.; crossbreds lower by ¼d. per lb."

Hides.—This market is very firm, all offerings at to-day's sale selling readily at prices ruling in sellers' favour. Heavies, extra, 5¼d.; heavies, 5⅛d.; medium and light, 4¾d. to 5d.; medium and light, dirty condition, 4½d. to 4¾d.; dry, 4½d. to 5¼d.; damaged and cut, 3¾d. to 4¼d.

Kangaroo Skins.—Our catalogue included some nice-conditioned lines from the North-West, in the sale of which considerable interest was taken. Keen competition ruled throughout, and values received show a rise of 1d. to 2d. per lb. Blue skins were in strong demand at quotations:—¾lb. to 1¼lb. average, 2s. 4d. to 2s. 7½d. red skins, 2s. 5d. to 2s. 6d. blue skins; 1½lb. average, 2s. 1d. to 2s. 4d. red skins, 2s. 2d. to 2s. 4d. blue skins; 1¾lb. to 2lb. average, 1s. 9d. to 1s. 11½d. red skins, 1s. 10d. to 2s. blue skins; extra heavy and very light weights, 1s. 3d. to 1s. 8d. red skins, 1s. 3d. to 1s. 8d. blue skins; damaged lines, 1s. 4d. to 1s. 8d. red skins, 1s. to 1s. 10d. blue skins; euro skins, 1s. 4d. to 1s. 10d. red skins; brush kangaroo, to 1s. 5d. blue skins.

Opossum Skins.—Only moderate offerings, and values allow of no alteration in quotations, but for fresh incoming skins prices will continue to advance. Two fair greys, 4s. 6d. to 5s. 6d. per dozen; one good grey, 5s. 6d. to 6s. 6d.; three blacks, 10s. to 16s.

Tallow.—A small offering met a ready sale at quotations. Good mixed (in casks), to 20s. per cwt.; medium mixed, 18s. to 19s. per cwt.; inferior mixed, 17s. to 18s. per cwt.; tins and oddments, 16s. to 18s. per cwt.

Horns, Hair, etc.—An improvement in the values of horse hair is the only change to report in these lines. Horns, large and fresh, 45s. to 50s. per 100; small and fresh, 17s. 6d. to 20s.; stale and perished, 5s. to 10s.; very small, to 2s. 6d.; rough bones, to 3s. 6d. per cwt., horse hair, to 1s. 5d. per lb.; cow hair, to 6d. per lb.

THE CLIMATE OF WESTERN AUSTRALIA DURING MARCH, 1905.

The weather throughout the month has been mainly fine, but frequently sultry, with moderate temperatures. Pressure was considerably in excess of the average throughout the State. Temperatures were also unusually high in the tropics, about an average in Central, Southern, and goldfields areas, and below normal along the South coast. The highest maximum recorded was 114·8 at Marble Bar, and the lowest minimum 31·8 on the Collie coalfields.

Rainfall was very light, and below the average for previous years throughout. Even in the tropics only a few showers fell, except in the far east portions of Kimberley, where Turkey Creek reported 719 points.

The Climate of Western Australia during March, 1905.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	March, 1905.					* Average for previous Years.				Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
						Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.			
NORTH-WEST AND NORTH COAST:	Wyndham ...	29·901	29·801	30·036	29·714	99·0	80·9	90·0	106·2	74·4	94·7	78·2	104·2	70·0	117	8	1042
	Derby	29·908	29·829	30·036	29·802	97·8	78·3	88·0	102·2	73·6	95·5	76·8	105·0	64·0	48	3	1299
	Broome ...	29·919	29·813	30·010	29·817	95·8	78·9	87·4	104·4	75·6	92·9	76·7	102·5	62·8	*Nil*	...	372
	Condon ...	29·914	29·842	29·998	29·797	94·5	73·1	83·8	105·8	68·0	93·2	73·2	104·0	56·5	99	2	217
	Cossack ...	29·902	29·820	29·996	29·752	98·9	77·4	88·2	110·0	74·0	96·1	76·4	111·2	65·0	*Nil*	...	234
	Onslow ...	29·914	29·830	30·034	29·783	96·0	73·3	84·6	107·0	66·0	96·8	73·7	112·0	63·0	9	2	243
	Winning Pool	...	...	...	...	...	...	...	...	...	...	...	...	...	271	2	450
	Carnarvon ...	29·969	29·895	30·164	29·857	88·8	69·9	79·4	106·8	58·0	89·7	70·0	110·3	56·0	6	1	285
	Hamelin Pool ...	29·970	29·891	30·140	29·830	95·0	67·0	81·0	109·0	55·0	95·2	66·9	112·8	50·6	10	1	143
	Geraldton ...	30·045	29·976	30·180	29·890	82·0	59·0	70·5	94·0	50·0	83·4	62·0	107·0	48·8	16	3	62
INLAND:	Hall's Creek ...	...	29·872	...	...	100·3	73·3	86·8	106·8	62·6	93·5	71·9	104·0	54·8	35	3	438
	Marble Bar ...	...	...	...	...	106·1	76·0	91·0	114·8	69·5	102·4	75·3	111·4	59·6	104	4	544
	Nullagine ...	29·900	29·852	30·047	29·735	101·5	75·2	88·4	109·0	70·0	95·3	70·4	110·0	54·9	69	3	209
	Peak Hill ...	29·950	29·875	30·090	29·820	95·0	70·0	82·5	103·0	60·0	92·8	69·1	102·8	52·8	3	1	172
	Wiluna ...	29·958	...	30·141	29·758	93·7	64·7	79·2	101·8	55·0	...	...	...	...	11	1	188
	Cue	30·005	29·912	30·160	29·770	95·0	68·0	81·5	105·9	52·2	94·2	66·5	108·2	49·5	2	1	152
	Murgoo ...	...	...	...	...	94·1	68·7	82·4	106·0	56·0	...	...	...	...	*Nil*	...	21
	Yalgoo ...	29·987	29·928	30·149	29·792	94·8	64·8	79·8	104·7	50·2	91·9	64·0	107·7	48·6	34	3	313
	Lawlers ...	30·012	29·935	30·225	29·860	89·4	66·8	78·1	102·7	54·0	89·5	65·2	105·1	46·8	2	2	82
	Laverton ...	30·034	29·991	30·272	29·771	88·9	63·7	76·3	102·0	51·3	88·1	62·3	103·2	48·2	1	1	85
	Menzies ...	30·052	29·976	30·290	29·775	87·8	61·7	74·8	102·9	46·9	87·3	61·8	105·0	46·0	8	1	23
	Kanowna ...	...	...	...	...	84·9	58·9	71·9	98·0	44·8	...	...	...	...	53	2	117
	Kalgoorlie ...	30·073	30·006	30·326	29·781	85·7	59·7	72·7	98·9	46·4	86·0	59·8	104·0	43·8	17	2	115
	Coolgardie ...	30·056	29·998	30·324	29·769	85·1	58·2	71·6	99·6	44·0	85·9	58·5	104·2	43·5	17	2	123
	Southern Cross	30·056	29·978	30·282	29·805	88·5	51·6	70·0	102·0	41·5	87·5	56·8	105·6	40·0	*Nil*	...	97
	Kellerberrin ...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	18
	Walebing ...	...	...	...	...	87·9	55·6	71·8	102 0	40·0	...	...	...	...	1	1	47
	Northam ...	...	...	...	...	87·9	56·0	72·0	102·0	44·0	...	...	...	...	9	2	32
	York	30·085	30·010	30·280	29·880	86·0	54·0	70·0	101·0	49·0	86·4	55·2	105·2	41·1	4	2	16
	Guildford ...	...	...	...	...	85·0	55·5	70·2	97·4	43·0	86·2	56·7	105·8	42·1	25	4	41

* Averages for three years only.

The Climate of Western Australia during March, 1905—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						March, 1905.					* Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:	Perth Gardens ...	30·092	30·028	30·388	29·897	81·6	58·2	69·9	93·0	46·0	84·0	60·6	104·0	45·4	29	4	44
	Perth Observatory	30·100	30·023	30·299	29·929	80·9	58·6	69·8	94·3	49·1	80·9	60·0	103·7	45·8	29	5	47
	Fremantle ...	30·111	30·025	30·288	29·945	76·0	60·2	68·1	92·5	49·0	77·8	61·6	100·1	48·3	12	3	29
	Rottnest ...	30·110	29·996	30·263	29·951	73·8	61·7	67·8	88·4	47·6	75·9	63·1	95·0	52·2	9	4	21
	Mandurah ...	...	...	...	...	80·3	54·8	67·6	94·0	41·0	80·7	56·2	99·2	38·8	10	1	54
	Marradong ...	...	...	...	...	...	...	...	...	...	...	...	...	...	*Nil*	...	45
	Wandering ...	...	...	...	...	80·6	47·6	64·1	97·0	36·0	...	...	...	...	4	1	25
	Narrogin ...	...	...	...	...	81·7	50·6	66·2	95·0	36·0	...	...	...	...	11	1	53
	Collie	...	...	...	...	81·0	46·3	63·6	94·0	31·8	81·2	48·1	100·8	34·7	6	1	83
	Donnybrook ...	...	...	...	...	80·7	50·2	65·4	94·0	32·6	...	...	...	...	*Nil*	...	29
	Bunbury ...	30·125	30·046	30·300	29·970	76·1	54·6	65·4	89·0	39·0	71·4	55·6	96·5	40·0	11	4	91
	Busselton ...	...	...	...	...	77·5	50·7	64·1	89·0	38·0	77·5	51·5	93·8	36·7	6	4	47
	Cape Naturaliste	30·129	...	30·319	29·957	70·9	55·8	63·4	79·0	49·2	...	...	...	...	16	3	58
	Bridgetown ...	...	...	...	...	79·8	45·4	62·6	92·0	32·6	80·3	46·2	100·9	31·2	22	4	60
	Karridale ...	30·111	30·060	30·276	29·876	72·0	53·0	62·0	86·0	43·0	74·4	54·2	101·5	40·8	33	5	116
	Cape Leeuwin ...	30·115	30·026	30·290	29·850	71·0	60·0	65·5	78·0	55·0	71·7	60·8	91·0	50·5	26	7	92
	Katanning ...	30·100	30·029	30·320	29·860	80·0	50·0	65·0	93·0	36·0	80·5	51·0	102·8	35·0	11	1	35
	Mt. Barker ...	...	...	...	...	74·3	49·2	61·8	88·0	39·0	...	...	...	...	50	7	123
	Albany	30·152	30·052	30·366	29·893	69·8	52·5	61·2	81·4	39·8	71·8	54·9	98·4	38·7	112	7	216
	Breaksea... ...	30·150	30·048	30·360	29·860	66·0	59·0	62·5	75·0	45·0	68·5	58·3	93·0	48·0	93	10	173
	Esperance ...	...	30·058	...	...	75·2	55·5	65·4	96·2	42·8	76·7	56·8	104·4	40·6	144	5	522
	Balladonia ...	30·136	...	30·411	29·808	81·3	52·2	66·8	100·0	40·2	...	...	...	...	11	3	151
	Eyre	30·086	30·060	30·356	29·764	76·9	56·1	66·5	96·8	38·2	77·5	56·6	105·0	38·2	20	5	95
INTERSTATE.																	
	Perth	30·100	30·023	30·299	29·929	80·9	58·6	69·8	94·3	49·1	80·9	60·0	103·7	45·8	29	5	47
	Adelaide	30·128	30·068	30·393	29·856	79·3	56·0	67·6	101·6	46·7	81·4	59·2	108·0	44·8	15	...	191
	Melbourne	...	29·966	...	...	...	...	...	...	...	74·7	54·6	105·5	37·1	96	5	426
	Sydney	30·090	30·054	30·350	29·790	75·0	64·0	70·0	90·0	59·0	75·4	63·1	103·6	48·8	898	...	1,258

* Averages for three years only.

The Observatory, Perth, 5th April, 1905.

W. E. COOKE, Government Astronomer.

RAINFALL for February, 1905 (completed as far as possible), and for March, 1905 (principally from Telegraphic Reports).

STATIONS.	FEBRUARY.		MARCH.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham ...	476	11	117	8
6-Mile	573	6	...	...
The Stud Station	...	...	...	...
Carlton	732	13	...	...
Rosewood Downs	...	...	...	...
Argyle Downs ...	...	...	...	...
Lisadell	...	...	..	...
Turkey Creek ...	437	13	719	3
Flora Valley ...	...	...	...	...
Hall's Creek ...	256	9	35	3
Nicholson Plains	...	...	...	...
Ruby Plains ...	...	...	...	...
Denison Downs...	...	...	...	...
WEST KIMBERLEY:				
Obagama ...	864	13	..	...
Beagle Bay ...	583	10	...	...
Pt. Torment ...	732	8	...	...
Derby	716	11	48	3
Yeeda	376	10	...	...
Liveringa ...	278	8	...	...
Leopold Downs...	...	...	...	...
Fitzroy Crossing	381	8	72	6
Fitzroy (C. Blythe)	...	...	...	...
Quanbun ...	362	9	...	...
Nookanbah ...	...	...	...	...
Broome	244	8	Nil	...
Roebuck Downs	446	10	...	...
Thangoo... ...	...	...	...	...
La Grange Bay...	322	6	6	2

STATIONS.	FEBRUARY.		MARCH.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST:				
Wallal	173	4	10	1
Condon	103	3	99	2
Pardoo	...	...	...	...
DeGrey River ...	157	1	...	...
Port Hedland ...	199	4	Nil	...
Boodarie ...	201	2	...	...
Warralong ...	204	4	...	...
Muccan	190	3	...	...
Ettrick	117	2	...	...
Mulgie	69	3	...	...
Eel Creek ...	...	...	...	...
Station Peake ...	70	3	...	...
Coongon	89	4	...	...
Warrawagine ...	...	...	...	...
Bamboo Creek ...	80	3	16	...
Marble Bar ...	203	6	104	4
Warrawoona ...	113	5	46	3
Corunna Downs...	110	2	...	...
Nullagine ...	65	1	69	3
Mt. Edgar ...	...	...	...	...
Kerdiadary ...	122	2	...	...
Roy Hill... ...	129	3	...	...
Middle Creek ...	70	2	...	...
Mosquito Creek	...	...	...	...
Mulga Downs ...	47	2	...	...
Woodstock ...	74	3	...	...
Mt. Florence ...	...	...	...	...
Tambrey ...	228	6	...	...
Millstream ...	349	4	...	...
Yandyarra ...	...	...	...	...
Mallina	182	2	...	...
Whim Creek ...	310	3	161	5
Cooyapooya ...	562	5	...	...
Woodbrooke ...	297	3	...	...

RAINFALL—*continued.*

Stations.	February.		March.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST—*cont.*				
Croydon	...	...	...	...
Balla Balla	...	...	...	...
Roebourne	262	3	Nil	...
Cossack	234	2	Nil	...
Sherlock	160	2	...	...
Fortescue	340	2	Nil	...
Mardie	215	2	...	...
Mt. Stewart	...	...	...	...
Yarraloola	152	3	...	...
Chinginarra	150	2	...	...
Onslow	186	2	9	2
Peedamullah	166	4	...	...
Red Hill	261	4	..	...
Mt. Mortimer	168	3	...	...
Peake Station	505	5	...	...
Wogoola	...	...	...	...
Nanutarra	...	...	...	...
Yanrey	157	3	...	...
Point Cloates	512	2	...	...
GASCOYNE:				
Winning Pool	179	5	27	2
Coordalia	210	2	...	...
Towara	113	4	...	...
Ullawarra	120	2	...	...
Maroonah	175	2	...	...
Gifford Creek	95	3	...	...
Bangemall	...	...	...	...
Mt. Augustus	...	...	...	...
Minnie Creek	...	...	...	...
Yanyeareddy	137	3	...	...
Williambury	72	3	...	...
Booloogooroo	331	2	...	...
Wandagee	210	3	...	...
Bernier Island	...	...	...	...
Boolathana	383	3	...	...
Carnarvon	279	2	6	1
Brick House	420	2	...	...
Doorawarrah	184	3	...	...
Bintholya	100	2	...	...
Mungarra	Nil	...	...	...
Clifton Downs	...	...	...	...
Dairy Creek	30	2	...	...
Upper Clifton Downs	65	5	...	...

Stations.	February.		March.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Dirk Hartog Island	...	...	...	...
Sharks Bay	145	2	Nil	...
Kararang	31	1	...	...
Meedo	...	...	...	...
Tamala	31	1	...	...
Wooramel	246	3	2	1
Hamelin Pool	133	3	10	1
Byro	20	2	...	...
Yarra Yarra	26	1	...	...
Berringarra	14	1	...	...
Mt. Gould	25	2	...	...
Moorarie	Nil	...	...	...
Wandary	52	2	...	...
Peak Hill	27	3	3	1
Mt. Fraser	32	3	7	1
Abbotts	24	1	N	...
Belele	...	...	...	...
Mileura	13	2	...	...
Milly Milly	74	3	...	...
Manfred	23	3	...	...
New Forest	726	1	...	...
Woogorong	14	1	...	...
Boolardy	Nil	...	...	...
Twin Peaks	...	..	...	...
Billabalong	380	1	...	...
Wooleane	37	1	...	...
Woolgorong	370	5	...	...
Murgoo	21	3	Nil	...
Yallalonga	600	1	...	...
Meka	Nil	...	...	...
Mt. Wittenoom	24	4	...	...
Nannine	22	1	9	1
Star of the East	21	1	8	1
Annean	15	1	...	...
Coodardy	46	3	...	...
Cue	68	5	2	1
Day Dawn	37	2	Nil	...
Lake Austin	40	3	Nil	...
Lennonville	76	5	10	1
Mt. Magnet	44	5	10	1
Challa	20	2	10	1
Youeragabbie	...	...	...	...
Black Range	73	3	...	...
Murrum	83	2	...	...
Burnerbinmah	204	4	...	...
Barnong	284	4	...	...

RAINFALL—*continued.*

STATIONS.	FEBRUARY.		MARCH.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Mellenbye ...	203	7	...	...
Yalgoo	252	4	34	3
Wagga Wagga ...	214	3	49	2
Gabyon	242	2	...	...
Tallyrang ...	216	2	...	...
Gullewa	202	4	...	...
Muralgarra ...	158	2	36	1
Wydgee	85	2	...	...
SOUTH-WEST DIVISION (NORTHERN PART):				
Murchison House	26	2	...	...
Mt. View ...	8	2	...	...
Mumby	64	3	...	...
Yuin	175	1	...	...
Northampton ...	47	2	3	1
Oakabella ...	18	...	...	...
Narra Tarra ...	...	...	...	...
Tibradden ...	50	3	...	...
Myaree	47	5	...	...
Sand Springs ...	...	...	...	...
Mullewa... ...	121	3	2	1
Kockatea ...	129	2	5	1
Bootenal ...	...	...	...	...
Geraldton ...	42	6	16	3
Greenough ...	42	4	10	1
Bokara	39	4	6	1
Dongara ...	57	5	5	1
Dongara (Pearse)	...	...	...	...
Strawberry ...	32	2	17	1
Nangetty ...	...	...	...	...
Mingenew ...	59	6	17	1
Urella	35	2	22	1
Rothesay ...	220	7	...	...
Field's Find ...	250	3	...	...
Carnamah ...	36	4	Nil	...
Watheroo ...	28	6	Nil	...
Dandaragan ...	13	2	Nil	...
Moora	17	4	Nil	...
Yatheroo ...	20	2	...	...
Walebing ...	36	4	1	1
Round Hill ...	14	2	Nil	...
New Norcia ...	9	2	Nil	...
Wannamel ...	19	2	21	2

STATIONS.	FEBRUARY.		MARCH.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WESTERN DIVISION, CENTRAL (COASTAL):				
Gingin	1	1	1	1
Belvoir	11	1	14	2
Mundaring ...	9	1	...	...
Wandu	9	3	30	6
Guildford ...	4	3	25	4
Kalbyamba ...	2	2	6	3
Canning W't'r'w'ks	...	...	...	...
Perth Gardens ...	1	1	29	4
Perth Observatory	2	2	29	5
Subiaco	1	1	24	3
Fremantle ...	11	3	12	3
Rottnest... ...	4	1	9	4
Rockingham ...	35	2	15	1
Jarrahdale ...	31	2	14	2
Serpentine ...	36	2	6	2
Mandurah ...	29	2	10	1
Pinjarra	Nil	...	16	2
Yarloop	28	3	...	...
Cookernup ...	...	...	...	...
Harvey	30	2	14	2
Upper Murray ...	23	3	...	...
SOUTH-WEST, CENTRAL PART (INLAND):				
Hatherley ...	90	2	...	...
Dowerin ...	48	3	...	...
Momberkine ...	36	2	6	1
Monglin ...	...	...	...	...
Newcastle ...	11	1	Nil	...
Eumalga ...	8	2	5	3
Northam ...	14	1	9	2
Grass Valley ...	12	1	2	1
Meckering ...	17	1	4	...
Cunderdin ...	31	3	...	...
Codg-Codgin ...	51	3	...	...
Yarragin ...	59	2	10	2
Doongin... ...	22	2	...	...
Cutenning ...	Nil	...	...	...
Whitehaven ...	...	...	...	...
Sunset Hills ...	16	2	...	...
Cobham	7	2	5	1

RAINFALL—*continued.*

STATIONS.	FEBRUARY.		MARCH.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST, CENTRAL—*contd.*				
Yenelin	17	1	...	...
Mt. Caroline	19	1	...	...
York	5	1	4	2
Dalbridge	28	2	5	1
Beverley	Nil	...	Nil	...
Bally Bally	19	3	...	...
Barrington	Nil	...	...	...
Qualin	10	3	...	...
Stock Hill	36	1	...	...
Sunning Hill	16	3	21	4
Brookton	18	2	51	4
Wandering	10	1	4	1
Glen Ern	1	1	17	4
Pingelly	3	1	7	1
Yornan	6	1	27	2
Marradong	21	1	Nil	...
Bannister	26	1	...	...
Wounaminta	13	2	...	...
Narrogin	15	2	11.	4
Narrogin State Farm	8	1	11	1
Gillimaning	6	1	...	...
Bunking	...	...	...	...
SOUTH-WEST DIVISION (SOUTHERN PART):				
Bunbury	43	3	11	4
Brunswick	46	2	...	...
Collie	32	2	6	1
Glen Mervyn	19	1	11	2
Donnybrook	18	1	Nil	...
Boyanup	29	2	...	...
Ferndale	Nil	...	...	...
Busselton	12	2	6	4
Quindalup	5	1	...	...
Cape Naturaliste	24	2	16	3
Lower Blackwood	Nil	...	...	...
Karridale	14	3	33	5
Cape Leeuwin	13	3	26	7
Biddellia	8	2	...	...
The Warren	17	5	140	6
Lake Muir	Nil	...	...	...

STATIONS.	FERBUARY.		MARCH.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST—*continued.*				
The Peninsula	Nil	...	...	...
Mordalup	Nil	...	...	...
Deeside	2	1	...	...
Riverside	10	2	...	...
Balbarup	4	1	...	...
Wilgarup	Nil	...	...	...
Bridgetown	Nil	...	22	4
Westbourne	3	2	...	...
Hilton	Nil	...	14	4
Greenbushes	Nil	...	...	...
Greenfields	6	1	...	...
Glenorchy	...	...	...	...
Williams	51	1	Nil	...
Arthur	28	1	Nil	...
Darkan	...	...	...	...
Wagin	26	1	3	1
Glencove	13	1	13	2
Dyliabing	14	2	...	...
Katanning	7	1	11	1
Kojonup	15	1	22	4
Broomehill	7	1	10	1
Sunnyside	Nil	...	17	3
Talbot House	15	3	12	1
Woodyarrup	4	3	21	5
Mianelup	1	1	10	3
Cranbrook	7	1	22	4
Toolbrunup	1	1	7	2
Tambellup	2	1	...	...
Blackwattle	...	...	...	...
Woogenellup	22	3	...	...
Mt. Barker	23	5	50	7
Kendenup	5	1	27	4
St. Werburgh's	16	4	52	5
Forest Hill	29	4	...	...
Denmark	34	5	...	...
Grasmere	23	6	128	7
Albany	31	5	112	7
King River	16	2	...	...
Point King	37	4	123	6
Breaksea	32	11	93	10
Cape Riche	34	3	...	...
Cheralillup	...	...	...	...
Pallinup	Nil	...	...	...
Bremer Bay	9	2	34	5
Peppermint Grove	18	6	...	...

RAINFALL—*continued.*

STATIONS.	FEBRUARY.		MARCH.		STATIONS.	FEBRUARY.		MARCH.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.		No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN DIVISION:					EASTERN—*contd.*				
Dural	6	2	...	...	Koorarawalyee ...	114	2	5	1
Wiluna	Nil	...	11	1	Karalee	90	1	...	...
Gum Creek ...	Nil	...	...	...	Yellowdine ...	...	...	...	...
Mt. Sir Samuel ...	3	1	Nil	...	Southern Cross ...	54	2	Nil	...
Lawlers	13	5	2	2	Parker's Range ...	99	3	5	2
Leinster G.M. ...	Nil	...	...	...	Parker's Road ...	55	2	...	...
Darda	...	...	...	...	Mt. Jackson ...	74	2	...	...
Duketon ...	6	1	...	...	Bodallin ...	54	2	Nil	...
Mt. Leonora ...	19	4	Nil	...	Burracoppin ...	49	3	...	...
Mt. Malcolm ...	16	2	Nil	...	Kellerberrin ...	6	1	4	1
Mt. Morgans ...	Nil	...	Nil	...	Merriden ...	56	3	Nil	...
Laverton ...	...	1	1	1	Nangeenan ...	22	3	Nil	...
Murrin Murrin ...	10	1	Nil	...	Mangowine ...	58	2	...	...
Yundamindera ...	7	2	Nil	...	Wattoning ...	...	...	...	...
Tampa	Nil	...	...	...	Noongarin ...	29	2	...	...
Kookynie ...	13	1	1	1					
Niagara	12	1	1	1					
Yerilla	Nil	...	Nil	...	EUCLA DIVISION:				
Quandinnie ...	...	...	Nil	...					
Edjudina ...	...	...	...	...	Ravensthorpe ...	67	9	8	4
Menzies	15	3	8	1	Coconarup ...	62	6	...	...
Mulline	6	1	14	4	Hopetoun ...	47	4	8	1
Waverley ...	49	3	30	4	Fanny's Cove ...	35	2	...	...
Goongarrie ...	29	2	6	2	Park Farm ...	58	6	...	...
Mulwarrie ...	52	2	10	1	Esperance ...	75	6	144	5
Bardoc	44	2	13	2	Gibson's Soak ...	82	4	...	...
Broad Arrow ...	44	3	30	2	30-Mile Condenser	66	3	...	...
Kurnalpi ...	25	2	9	2	Swan Lagoon ...	73	4	...	...
Bulong	51	2	10	1	Grass Patch ...	...	...	...	...
Kanowna ...	53	2	53	2	Myrup	103	5	...	...
Kalgoorlie ...	72	2	17	2	Lynburn ...	101	6	...	...
Coolgardie ...	60	3	7	2	Boyatup ...	...	...	...	...
Burbanks ...	70	4	51	4	Middle Island ...	...	...	...	...
Woolubar ...	...	...	...	...	Point Malcolm ...	95	4	...	...
Widgiemooltha ...	77	3	49	4	Israelite Bay ...	99	5	12	4
Waterdale ...	59	2	...	...	Balbinia	88	2	...	...
50-Mile Tank ...	87	2	Nil	...	Frazer Range ...	100	3	...	...
Lake View ...	103	4	...	...	Balladonia ...	87	3	11	3
Norseman ...	121	3	Nil	...	Southern Hills ...	107	2	...	...
Bulla Bulling ...	76	3	40	3	Eyre	21	4	20	5
Boondi	90	3	8	2	Mundrabillia ...	...	...	...	...
Boorabbin ...	99	3	Nil	...	Eucla	16	2	21	1

The Observatory, Perth,
5th April, 1905.

W. E. COOKE,
Government Astronomer.

By Authority: WM. ALFRED WATSON, Government Printer, Perth.

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NOTES.

Presentation to Mr. A. Crawford.—After filling for a little under two years the position of Acting Director of Agriculture, Mr. A. Crawford, who undertook this important position when Mr. W. Paterson relinquished the directorship to devote his attention to the management of the Agricultural Bank, was on Monday, 1st May, invited by the officers of the department to meet them in order that they might have the opportunity of making him a presentation and express their sincere regret that he was severing his connection with the department. The chair was occupied by the horticultural and viticultural expert (Mr. A. Despeissis), who referred in complimentary terms to Mr. Crawford's able administration. The officers were exceedingly sorry to lose a head with whom they had worked so amicably, and who had so continuously considered their interests. Mr. Crawford's *régime* had been marked by justice, ability, and energy. They wished him every prosperity and success in the future. (Applause.) Mr. W. B. Hooper (chief clerk), Dr. Morrison (Government Botanist), Messrs. H. S. Keast (accountant), H. M. Wilson (inspector of the rabbit division), and T. Hooper (chief inspector of orchards), supported these remarks. The Acting Director was then presented with a handsomely-framed group photograph of the officers of the department. Mr. Crawford said they could have given him nothing which he would treasure more than the photograph. It would serve as a perpetual reminder of his connection with the department. He thanked the officers for the hearty assistance they had always given him by their industry and attention to their duties, and he asked that the same loyalty and assistance should be accorded to the new Director, Mr. C. F. Chaplin.

THE NEW DIRECTOR.—Mr. C. F. Chaplin, who was recently appointed Director of Agriculture, took up his duties on the 1st May, and, after studying the administrative portion of his work of the department, left on the 8th May on a tour of inspection of the Hamel Experimental Station and the Harvey and Bunbury districts. Mr. Alex. Crawford accompanied Mr. Chaplin, and will point out to him the principal features of the districts being visited. The party will return to town about the time that the *Journal* is published.

COWCOWING AGRICULTURAL AREA.—The attention of agriculturists and intending settlers is drawn to the advertisement appearing on page XVI. in connection with the Cowcowing Agricultural Area of 95,000 acres, which has been subdivided into 123 lots, at prices of 10s. and 11s. per acre, payable in 20 years. This land is within easy reach of Goomalling, with an average rainfall of about 12 inches, and is described as of splendid quality for cereal growing and stock raising. Intending settlers are urged by the Lands Department to visit the land and secure what they require early, so as to avoid disappointment.

GINSING.—An inquiry was made the other day from Yarloop as to whether Ginsing was growing in this State, and the following reply was sent:—"So far as we know, Ginsing has never been grown in West Australia. In Queensland it has been grown to a limited extent by a few Chinamen. The plant is a perennial, growing to a height of about 24 inches. The roots, as a rule, require from five to six years before any return can be got from them. To do best, it requires to be grown under shade, and seeds sometimes remain as long as 18 months in the ground before germinating. The cost of the seed in America is £30 per lb. It is generally planted about eight feet apart each way. About 12,000 seeds go to the pound, and the price of the dried roots in America averages from 15s. to 20s. per lb."

SECRETARIES OF AGRICULTURAL and other Societies are informed that the services of the poultry expert may be obtained (when not engaged) for the purpose of giving illustrated lantern lectures; also, arrangements may be made for him to personally inspect the poultry yards in any district required, on application.

ERRATA.—A couple of errors occurred in an article appearing in the April issue of the *Journal*, under the heading of "Bunt and Smut." The word "fungora" should have been "fungoid;" and in the paragraph dealing with solutions, it was made to appear that a kerosene bucket would contain ten gallons, whereas it should have been four gallons.

A NEW ASSOCIATION.—Farmers and others in and around Wagin have lately formed an association which they have named the Wagin Beekeepers, Poultry Fanciers, and Fruitgrowers' Association. The headquarters of the Association are at Wagin, and Mr. F. A. Pfeiffer has been appointed hon. secretary. The organisers are to be congratulated in that they have successfully inaugurated such a useful association, and it is to be hoped that much good to the district may accrue therefrom.

CANNAS.—The Government Botanist, Dr. Alex. Morrison, has given the following answer to an inquiry made of the Department as to whether Canna, otherwise known as Indian Shot, was injurious to cattle:—"Cannas are not known to possess any very strongly-marked qualities, but some have mildly medicinal properties, acting on the skin as diaphoretics. The fleshy underground stems, however, if not quite wholesome in the natural state, furnish arrowroot of superior quality, which is washed out of the crushed roots. Species of Canna, which belong to the family *Marantaceae*, supply the variety called "Tous-les-mois," while the Bermuda arrowroot is obtained from *Maranta arundiaacea*, another member of the same family. The foliage of the plants may have the same medicinal quality as the root, but even if so, it does not appear to have much effect on cattle."

TWO NEW DEPARTURES.—The Hon. the Minister for Lands has authorised the free distribution of the *Journal of the Department of Agriculture* to all *bonâ fide* farmers and settlers who make application to the Department of Agriculture, and in an advertisement appearing on page xxxvii. will be found all the necessary information relating to the mode of application to be made to be placed on the Free List. The other new departure is the appearance of advertisements of business firms in Perth and Fremantle, which will be found both at the commencement and at the end of the *Journal*. It is hoped that the free distribution privilege will be largely availed of, and that the information appearing in the *Journal* will be carefully read and advantage taken, at the first opportunity, of the advice given by the departmental experts. Should more explicit information be required on any subject than the farmer has the means of obtaining for himself, application should be made to the Director of Agriculture, and the best available advice will be given him.

PRUNING.

By A. DESPEISSIS.

The attention of fruit-growers will soon be engaged by the need of pruning their trees. A visit of inspection to the orchards impress one with the idea that, while a few introduce both method and judgment in this operation, a great many either trim their trees over-lightly or hack them about unmercifully, without rhyme or reason. Not a few, in order to avoid the pitfalls of improperly-pruned trees, and, besides, through pressure of other work, let the season pass by, and mentally promise themselves to do the pruning next year, and for the time being leave the trees alone; the reward coming speedily in the shape of a gratifying crop of fruit, they soon vote pruning a fad and an unnecessary nuisance.

In a few years, however, retribution follows in the shape of flagging vigour, broken limbs, chaotic growth, and uneven and undersize crops.

Chapters well stocked with dull facts and lengthy descriptions have been written about pruning, and to the beginner the whole matter appears such an enormous mass of points and facts to bear in mind, that no attempt is made to master these facts, or, if any endeavour at all is made in that direction, the whole thing often becomes a jumble.

To those who want to go more deeply into the subject, such books as Wickson's "California Fruits," Bailey's "Fruit Growing," and DuBreuil's "Culture of Fruit Trees," will be found of great help. Much local as well as general information will also be found in the chapter on "Pruning," in the Handbook of Horticulture and Viticulture, issued under the authority of this Department.

On this occasion I will confine myself to offering, for the consideration of the amateur pruner, a set of illustrations prepared from photographs taken several seasons running in my garden by Mr. G. C. Baker, until lately editor of this *Journal*, of a young apple tree picked out amongst several around it.

When transplanted from the nursery bed into the place they will permanently occupy, young trees should be pruned. This is made necessary by the reduction of the root system caused by the lifting. As the roots have been thinned, so must the top be reduced. How much should then be cut off is a matter which depends on the amount of roots cut off the freshness or otherwise of the roots remaining, the shape and kind of training to be given to the tree, and the climatic conditions which prevail during the growing months following the planting. Reference to Figs. 1 and 2 show a young apple tree supplied by one of the local nurseries, and planted in August,

1

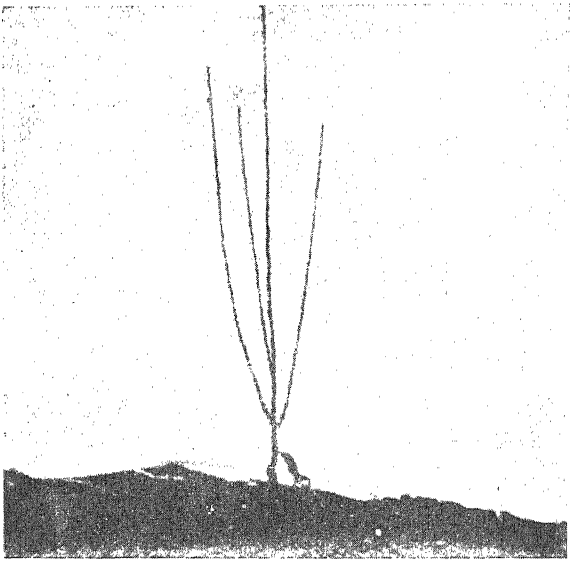


Fig. 1.—Newly planted apple tree, as received from the nursery.

2

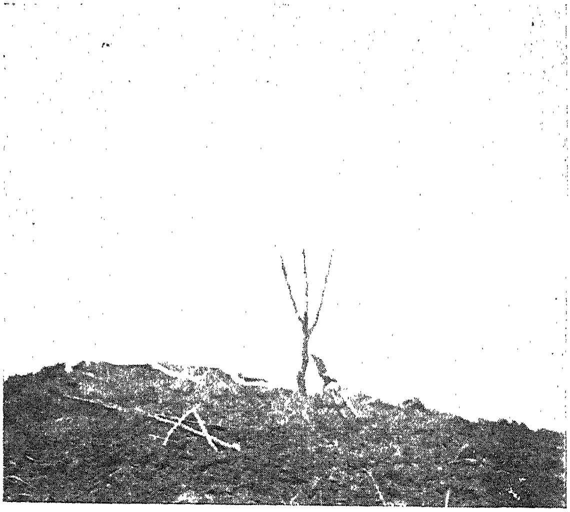


Fig. 2.—The same tree after the first pruning, immediately after planting.

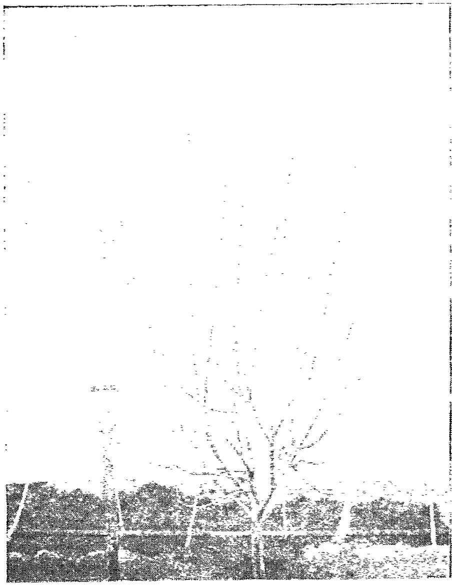
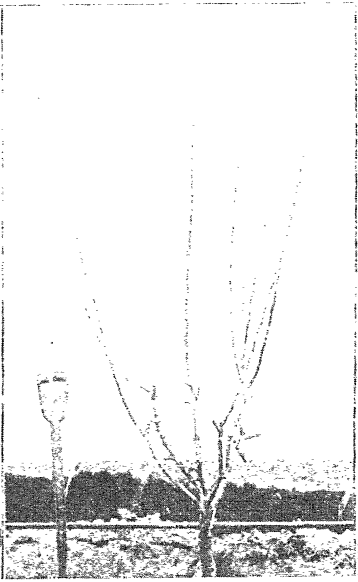



Fig. 3.—Young apple tree before winter pruning, two years after planting.
Fig. 4.—The same, with laterals shortened to form spurs and before leaders are cut back.
Fig. 5.—The same, as it looks after winter pruning.

1902, or nearly three years ago. The head consisted of four branches, three only were left, and the fourth one cut off. Of the remaining branches three-fourths were removed, and as the stem was very short, these branches were cut to outside buds about 10 inches from the stem. This cutting back gave ample opportunity to the root system to become active, and restore the connection with the earth, and thus absorb and pass on to the top the nourishing sap, which is there transformed into wood and leaf growth.

In Western Australia, where a long and dry summer may always be reckoned upon, it is sound practice to cut back hard all freshly-planted young trees. That hard pruning re-establishes the balance between the radical and the ærial parts of the plant.

During the first summer it is better, as a rule, not to interfere with the free growth, and everything should be done to promote it that good cultivation can do.

The first winter after planting the tree is pruned the second time, and a definite shape and direction are given to its leading branches. It is customary in Australia, as well as in California, to shape fruit trees vase or goblet fashion over a short stem.

To the three main branches allowed to remain from the first pruning it now becomes advisable to add a few more, selected from amongst the best placed shoots which may happen to have grown during the previous summer.

Not more than two secondary limbs to each of the first three need be kept. Any other growth is shortened back to three or four buds to gradually transform into fruit spurs. Those secondary limbs, or "leaders," which have been selected to constitute the framework of the tree are in their turn shortened back to 8 to 12 inches and cut to a sound wood-bud pointing in the desired direction.

The direction of growth of the leader influences the length to cut. The straighter up it grows the shorter it is cut; and, on the other hand, the more slanting it grows the longer it may be left. The reason of this treatment is that the flow of sap is the more rapid the straighter the growth; and as its pressure is greater towards its extremity it follows that the buds furthest up the branch are those that grow most readily.

These growths will supply wood for the future lengthening of the permanent limbs.

Whatever spare sap is left will cause the buds underneath to also grow, or to swell, but that growth will rarely be vigorous. It will result in twigs, which are either pinched back to the third or to the sixth leaf in October and November, in the spring time, as they grow, or else they are left alone until after the New Year, when they are cut back to form future fruit spurs.

An interruption shows between Fig. 2 and Fig. 3. It coincides with an absence of six months during the growing season, when I was away on a travel through the South of Europe.

The illustrations reproduced in Figs. 3, 4, 5, however, show the treatment of the same apple tree at the time of the third winter pruning, and when the tree was two years old. Fig. 3 shows the tree before pruning. The laterals, which should have been shortened during the previous growing season, had their full swing. They are now shortened back, as shown in Fig. 4, which illustrates the young tree only half pruned and before the leaders were cut back.

Fig. 5 shows the same tree after the leaders have been headed back to a length of about ten inches.

Reference to Figs. 6 and 7 show the same tree when in full leaf five months after, both before and after summer pruning.

Fig. 6 shows the tree very dense around the main limbs, where short and stumpy laterals were cut back at the time of winter pruning.

In the course of the treatment it then received in the summer, these growths were cut back to one eye on these lateral spurs, but the leaders were left untouched.

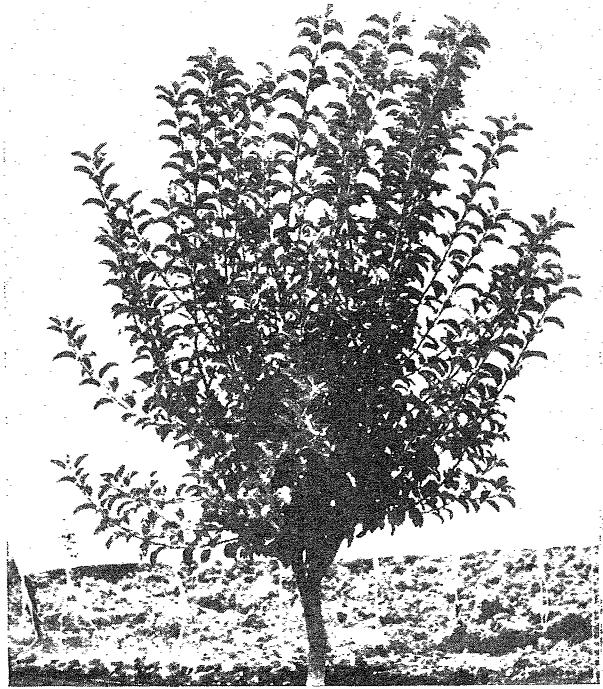
The tendency of the tree to be somewhat lop-sided, as seen by reference to Fig. 4, is now corrected by leaving a branch on the right-hand side (Fig. 7), which re-establishes a systematic growth of the head.

Since this photograph was taken last January, a few spindly short twigs have again tried to shoot from the spurs, in course of maturing, but they have been nipped back when still tender, and plump promising fruit buds are showing freely upon these spurs.

In a couple of years or so the pruning, both summer and winter, of this tree will have been much simplified. The framework will have been constructed, and upon it will be carried spurs, which will every season carry the fruit crop. As these spurs become too long and woody they will be gradually shortened, so that the fruit may receive its supply of sap as nearly as possible straight from the limbs.

This is, briefly stated, the treatment that a vigorous young tree can, without harm, receive.

The growers should be cautious, however, not to uniformly carry it out on every tree indiscriminately. It is only called for in the case of young and luxuriant growing trees, which are not readily setting to fruit, and spend a lot of energy uselessly in wood and leaf growth. Other trees, on the other hand, stunted and puny, would be further set back and irretrievably ruined by such treament, which would result in stimulating an abnormal fruit production, and leave the tree exhausted and enfeebled, and an easy prey to the numerous diseases which infest our orchards.



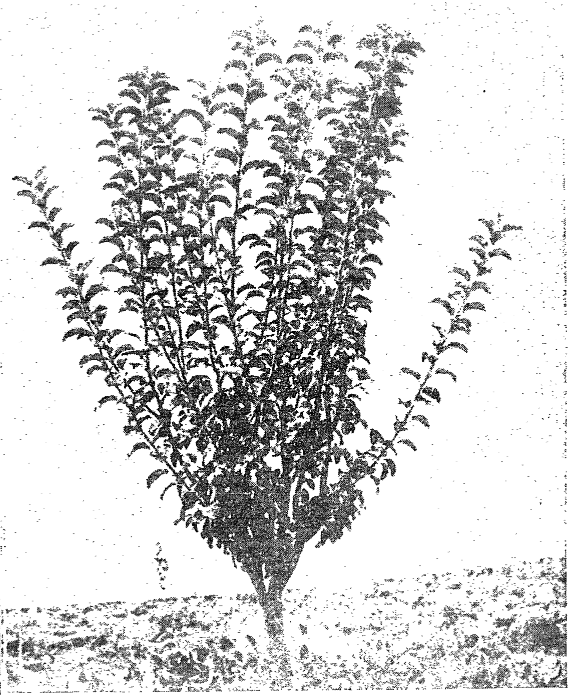


Fig. 6.—The same apple tree, as seen in January and before summer pruning.
Fig. 7.—The same tree after summer pruning. The laterals have been spurred, and the leaders will remain untouched until the time of winter pruning.

AFRICAN WONDER GRASS.

An inquiry was recently made from Katanning as to the value of this grass as a fodder plant or grazing grass, and whether it would be suitable for that district. Mr. G. F. Berthoud, manager of the State Farm, Hamel, gives the following useful information as to the best grasses for that particular district:—

"African Wonder Grass (*Panicum spectabile*) does not mature seed here, it is usually propagated by rooted branches like couch. A few sets may be obtained here in September. The seed is obtainable from Messrs. Haage & Schmidt, seedsmen, Erfurt, Germany; price 2s. 6d. per lb., post paid. Sow in spring. It is a summer grass, which, on suitable warm, *moist* lowland, will produce large quantities of good fodder. Here the foliage is killed by frost in winter. Plant the sets about six feet apart each way; apply a handful of superphosphate to be worked into the soil below the set when planting. Rhodes grass (*Chloris virgata*) would, I think, be more suitable for your soil. A few roots will be obtainable here in the spring. The seed may be obtained from Messrs. Anderson & Co., George Street, Sydney, at 1s. 6d. per packet, post paid. Sow in spring.

"The best lucerne is the Hunter River variety; price 10d. per lb. Sown broadcast it will require 10lbs. per acre.

"The following mixture, if sown now, should suit your land, for one acre:—

> "6lbs. Cocksfoot, price 3s.; 6lbs. Timothy, 3s.; 5lbs. Hungarian Forage, 5s.; 5lbs. Paspalum Dilitatum, 7s. 6d.; 2lbs. White Clover, 2s.; 2lbs. Tall Oat Grass, 2s. 6d.

"The above seeds and lucerne may be obtained at the prices quoted from Messrs. F. H. Brunning, 64 Elizabeth Street, Melbourne.

"The paspalum may also be sown in spring, say end of September.

"*Manure.*—Bone-dust, at the rate of 2cwt. per acre, to be sown broadcast on the ploughed land, and harrowed in well before sowing the seeds.

"The seed, if sown broadcast, should be well mixed with damp superphosphate. They will then be spread more evenly over the ground than when sown dry."

PURPURA-HEMORRHAGICA.

By R. E. WEIR, M.R.C.V.S.

As a sequel to influenza, this complaint is not uncommonly to be found amongst horses, which, through insanitary conditions prevailing, and want of care or proper treatment, are susceptible to its development. It also frequently occurs as the result of any disease of a debilitating nature, but, although commonly occurring from these reasons, it may arise quite independently to any previous ailment, more especially as the result of an anæmic state of the system, resulting from over-work, under-feeding, and subjection to exposure from want of proper stabling during the winter months. Although, as a rule, derived from diseases of an infectious nature, in itself it is of a non-contagious character, therefore no danger need be feared from its spread to animals with which the patient may have been in contact.

It is usually recognised by the sudden formation of swellings on various parts of the body, such as the head, legs, and lower portions of the abdomen, but particularly the hind legs. As a rule, such swellings are very pronounced, a distinct line of demarkation separating the swollen parts from the healthy tissues. At other times it may be somewhat diffused, spreading over a large surface of the body, though this is usually noticeable during the latter stages of the complaint, recovery being then somewhat doubtful. The legs and around the nostrils frequently swell to a great extent, in the latter case completely blocking up the air passage, and making respiration only possible through the mouth; this being a further characteristic by which the disease may be recognised, viz., the mouth being constantly partially open, and the tongue swollen. The animal usually stands throughout the complaint with its head depressed and having a tucked-up appearance. The mucous linings of the mouth and nostrils show more or less dark red or purple blots, and a dark coloured exudation of a somewhat offensive odour flows from the nostrils. The swellings are frequently seen to change their positions from one part of the body to another, and at times may altogether disappear from the external portions of the body and invade the internal parts. In the more severe cases the swellings may exude bloody serum, and finally gangrene and sloughing of the part will take place, so that a large raw surface will be left.

The internal organs frequently become implicated, and blood poison results therefrom, a fatal issue soon following. It is only in the milder forms of the disease that recovery is likely, the more severe cases usually proving fatal. As the disease, therefore, as a rule, results from a debilitated condition of the system, remedial measures require to be directed towards building up and, if possible, restoring the lost vitality. The animal should be placed in a well ventilated loose-box, where pure air, warmth, and comfort can be supplied. The body requires to be well rugged, and woollen bandages applied to the legs to assist in quickening the circulation. Food of a rich and easily digestible nature is to be given, such as warm mashes and scalded oats, boiled linseed, bran, and chaff. Should the appetite be completely lost, oatmeal gruel should be supplied as a substitute for the above, also a plentiful supply of cold water should always be at hand.

Medicinally.—Chlorate potassium in three or four dram doses twice or three times daily for the first few days; subsequently half doses are to be given. Sulph. iron in one dram doses may also be given, dissolved in water, every six hours.

FIGHTING THE CODLIN MOTH IN PERTH.

By G. WHITTINGTON.

In addition to my last report I am pleased to state that although this is the end of the fruit season I have up to the present date been unable to discover any sign of the Codlin Moth or its larvæ in the quarantined codlin area. I have continually and carefully inspected the trees and fruits throughout this area, with the above result.

On 7th, July 1904, I started the campaign against the above-named pest by cutting down or lopping back all pip trees in the seven infected gardens in Perth. The cuttings were immediately burnt on the premises. This was followed up on the 27th of September by spraying all the 72 gardens in the area enclosed by Chatsworth-road on the North, Newcastle-street on the South, Lake-street on the East, and Lord-street on the West. The spray was made up of Paris green 1oz., treacle 2ozs., quick-lime 8 ozs., to every 10 gallons of water. The first spraying was done just after the blossoms had set, and the spraying continued every two weeks until the fruits had become about three parts grown. I had a little trouble in some instances, as some of the trees did not blossom uniformly, and therefore necessitated a second spraying for the first setting of fruit. The fruits in all the infected gardens were picked when they became about the size of walnuts, cut open, inspected, and destroyed, thereby preventing any possibility of overlooked eggs or grubs getting away. I also constantly cut open fruits in the other gardens in different stages of growth, and I am pleased to say that in no single case have I found any sign of the moth or grub after the spraying commenced. I am, therefore, in my own mind convinced that by proper and constant spraying all pip trees within a radius of a quarter of a mile from the infected orchard, followed up by picking and destroying all the fruits in the infected orchards, and keeping a constant watch and doing the work thoroughly, it is possible to effectually check if not entirely eradicate this dire pest.

After the trees had been sprayed they were bandaged by pieces of sacking about 12in. wide doubled and tied round the trunks, making a band of 6in. wide, about one foot from the ground. These bandages were inspected constantly in case any grubs had got away and found a home in its folds.

COTTON GROWING IN THE NORTHAMPTON DISTRICT.

Mr. Frederick Emerson, of Geraldton, who has lately been making experiments in cotton growing and its suitability for the Northampton district, has forwarded the department the following interesting letter:—"I have pleasure in forwarding the following account of cotton growing in the Northampton district. The land on which the seeds were set was a light chocolate loam, very rich in vegetable humus. On the 1st of October, 1904, I planted the seed, which came up in about 10 or 12 days; there were a great many misses, and some of the plants looked very delicate; the seed had a slight mould on it as if packed before it was quite dry. The Peruvian seems to suit this district best, for the Abassy did not flower at all, though I watered one plant twice during December; it is a fine plant, 2 feet 6 inches high, and has a butt about 1 inch in diameter, and very large leaves, but it never showed any sign of coming into flower. The Peruvian, though the plants were small, all carried a crop of cotton; the bolls were a good size, and has very silky cotton, a sample of which you will find enclosed, which is a third of one boll. Last season was too dry for most summer crops, and cotton growing is in its infancy in Western Australia, and we must go on experimenting. From what I now know of the plant, I think in our district it would do better if planted early in September, which I shall try this coming season, for I have better-looking seed this time."

POTATO (1903) SEEDLINGS GROWN AT THE HAMEL FARM.

By G. F. BERTHOUD.

The following report on experimental potato plots has been forwarded to the Department by the manager of the farm, and should prove of considerable value to farmers and others who contemplate going in largely for potatoes:—

SETS.—Small whole tubers, planted 15th July, 1904.

SOIL.—Old garden land, consisting of fair light loam, well cultivated to a depth of 12 inches, and fairly good natural drainage.

MANURE.—Applied at the rate of six cwt. per acre at the time of planting.

GERMINATION.—Very slow and uneven owing to wet and cold weather prevailing during the early spring.

NOTE.—The above are the first selection of tubers raised from local crossbred seed, which was sown in December, 1903. The plants were taken up in April, 1904. All are late or second early kinds. Out of 400 plants raised, 143 of the most productive varieties were retained for this planting. All the tubers were sound and healthy when set. Nearly all produced fine, strong, healthy plants, which were taken up when ready in December, and, taken as a whole, gave very satisfactory and encouraging results. However, a large number were rejected, owing to rooty or ill-shaped tubers, and other faults. Tubers from 70 of the best shaped and most promising kinds were selected, carefully washed in formalin solution, and stored in boxes for late planting. Unfortunately the grub of the potato moth got in among them, doing considerable damage to the tubers. When noticed, I placed the bags in a malt tank with a tin containing a small quantity of carbon bisulphide, closed the lid, making same air-tight with putty. The tubers were left in the closed tank for 48 hours. When opened, I found all the grubs dead, but I regret to state that the tubers were badly damaged by the carbon fumes, all the young sprouts and buds being black and dried up. All these tubers were planted whole, in moist lowland, during the third week in January. Several varieties failed to come up. Those that did come up produced rather weakly plants, which will be ready for digging during May. Later on a report will be made on the yield, etc.

Those noted below are the most promising of those surviving:—

Seedling No. 6.—Growth healthy and even; height 18 inches; foliage and stalks pale green; flowers freely produced, large, and bright lilac colour; habit neat and compact. Taken up 3rd December; tubers round, eight to nine per plant; skin smooth, pale yellow; eyes set shallow; nice even shape. Second early.

Seedling No. 14.—Growth even; strong stalks; height two feet; level and neat; foliage pale green and healthy; flowers medium size, light lilac. Taken up 6th December; tubers of fairly even size, round; skin rough, pale yellow. Fair late variety.

Seedling No. 31.—Growth healthy and even; stalks strong; foliage dark green, wide, and flat; height two feet; flowers white. Taken up 3rd December; plants well ripened, and free from disease; up to 31 tubers per stalk; pebble-shaped; pale pink, deeper shade about the eyes; skin lightly netted; eyes set shallow; of fair even size. Promising second early variety.

Seedling No. 33.—Habit dwarf; stalks numerous; foliage dark green; flowers white; height 15 inches. Taken up 6th December; tubers round, deep red colour, rough skin; about 15 fair-sized tubers per plant. Second early variety.

Seedling No. 36.—Growth healthy; dwarf habit; height 12 inches; flowers pale lilac. Taken up 6th December; tubers flat, round; colour deep pink. Fair second early variety.

Seedling No. 66.—Growth healthy; foliage wide and flat, dark green colour; height 15 inches. Taken up 6th December; tubers of fair even size, oblong; skin slightly rough; shallow eyes; colour very pale pink, flushed deeper about the eyes. Fair late variety.

Seedling No. 93.—Growthy, vigorous, and branching; foliage medium size, dark green; height two feet three inches; flowers light lilac. Taken up 6th December; not fully ripe; tubers set close to stalk, round, rather roughly shaped; colour, pale pink. Late variety.

Seedling No. 99.—Habit vigorous and branching; foliage curled, deep green; flowers white; height two feet. Taken up 6th December; tubers round, medium size, of a pale yellow; up to 28 tubers per plant; eyes shallow. Fair prolific variety.

Seedling No. 113.—Growth good; foliage pale green; height two feet; flowers light lilac. Taken up 6th December; tubers rather small, but of a nice shape, round; shallow eyes; colour light pink. Second early variety.

Seedling No. 119.—Growth healthy; fine strong stalks; foliage slightly curled; height 20 inches; hardy and distinct variety. Taken up 6th December; tubers large, set rather far from the stalk, neat, evenly shaped; colour pink, with deep shade about the eyes, which are set rather deep. Promising variety.

Seedling No. 125.—Growth even and healthy; height 18 inches; flowers deep lilac. Taken up 6th December; not fully ripe; tubers flat, round; colour white, flushed pink. Late variety.

Seedling No. 126.—Stalks strong and branching, but not tall; foliage wide, dark green; height 18 inches; even and healthy. Taken up 6th December; tubers large, oblong, yellow; shallow eyes; up to 28 tubers per plant. Prolific variety.

Seedling No. 135.—Growth rather weak; height 12 inches. Taken up 6th December; tubers very good, of nice even size, round; eyes set rather deep; colour bright red. Good second early variety.

SEEDLINGS OF 1904.

New seed was sown in boxes at the end of August, and the young plants were set out in well-prepared beds early in October, when the weather appeared to be set warm and fine. However, a week after planting we had a hailstorm, followed by cold rain and winds, which killed all the young plants—1,400. This was very disappointing, but I had some seed left, which was at once sown, and in due course the little plants were pricked out in boxes and grown on until about three inches high, and strong. This batch, consisting of 750 plants, were set out in prepared beds of moist lowland on the 21st December. They came on very well, making strong, healthy stalks. They were taken up in the last week in March. Many of the plants gave heavy yields of fine tubers.

One plant produced 36 tubers, weighing in all 2lb. 15oz. These are the most promising lot of seedlings yet raised here. The tubers of all the most distinct and best plants have been selected and stored away for spring planting. I placed lime and flower of sulphur in the papers to keep out the moth, but it is very doubtful if this will be successful.

THE POTATO MOTH (*Lita Solanella*).

This troublesome little pest is very numerous here now. The grubs injure the growing plants by boring down into the hearts of the stalks, causing the tops to wilt and die off; also by entering all the tubers which are close under the surface, thereby doing serious damage, and reducing their market value.

The keeping and storage of seed tubers is now a very difficult matter. Spraying the plants does not appear to check the grubs effectively.

Blight.—The common black leaf fungus does very considerable damage to all varieties of potatoes grown here, attacking them both on old and new land. The foliage becomes covered with dark-coloured spots, which gradually spread and cause the leaves and stalks to die off. Spraying with Bordeaux mixture will check it and give fair results if done several times during the time of growth. This means a good deal of extra labour and attention. I have tried dipping the sets, both whole and cut, in a thick solution of lime and bluestone, made by dissolving the bluestone in hot and the lime in cold water, then mix. Use enough lime to make a thick solution that will adhere freely to the sets. After dipping they may be planted at once or allowed to dry. So far the plants grown from the treated sets are very healthy, with rich dark foliage. The plants are looking much better than those alongside planted in the ordinary way without dipping. They will be ready for digging about the 20th of May. The potato-grower here has plenty of difficulties to contend with on account of the numerous pests which destroy the fruits of his work.

Jersey Kidney.—Local seed, rather new, planted 19th July; did not germinate for several weeks; growth good; foliage large, dark green, and slightly curled; the plants produce only one stalk, which is very strong and tinted brown; height to two feet; taken up 6th December, about 14 days too soon, owing to disease appearing on the leaves; tubers set close to the stalk, oblong; skin white and smooth; of nice market size, very few small ones. Yield at the rate of six tons per acre. Table quality fair. Not a good keeper. I have rejected it.

The Freeman.—Imported seed from New South Wales; planted 19th July; germination quick and even; growth healthy and vigorous; foliage wide and flat, of a dull green; height 18 inches; taken up 22nd November; tubers of nice even medium size, oblong; white, smooth skin, and shallow eyes. Yield at the rate of six tons per acre. Table quality good, dry and floury. Fair keeper.

Champion.—Seed of this variety introduced from Ireland by Mr. C. Sheridan, of Hamel; planted 19th July; germination strong and even; growth vigorous; stalks strong; foliage wide, of a dark green colour; height two feet; taken up 22nd November; tubers numerous and large; round deep eyes; white, smooth skin. Yield very good; rate of nine tons per acre. Table quality fair; rather coarse; bad keeper. I have rejected this variety. Second early.

Early Manhattan.—Seed imported from Yates & Co., Sydney, which was sound and well forward; planted 21st September; germination even and vigorous; foliage wide, deep green, and slightly curled; stalks fairly strong; height 18 inches; healthy and level; flowers bright bluish lilac. Taken up 2nd January; tubers round, medium size, few small ones; colour purple, blotched with yellow; yield good, rate of 9 tons per acre; table quality good; boils dry and floury. Good second early variety.

Northern Star.—Local seed, being the produce of the tubers imported from Scotland in March, 1904; planted 6th September; seed rather new when set, but they came up fairly quick and even; growth very fine and vigorous; foliage dark green, and slightly curled; stalks strong and branching; height 2 feet 6 inches; level and neat; flowers small, white. Taken up 4th January; tubers large, oblong to round; skin white; yield very good, at the rate of 13 tons per acre; table quality inferior, being coarse and soapy; fair keeper. Late variety.

Queen of the Valley.—Seed imported from Yates & Co., Sydney; seed sound, nicely budded, planted 22nd September; germination even; growth healthy; foliage pale green, slightly curled; height two feet; fairly level; flowers deep lilac. Taken up 3rd January, when barely ripe; should have been left in 10 days longer. Tubers oblong, deep pink, of neat, even size. Yield at the rate of six tons per acre; table quality good; keeps well. Main crop variety.

Beauty of Hebron.—Planted 26th September; seed imported from Yates & Co., Sydney; a fairly sound lot, but a few rotted. Growth very vigorous and even; foliage pale green, wide and smooth; height two feet; flowers white. Taken up 3rd January; tubers large, oblong; skin white, and flushed with pink; few small ones; fine market sample. Yield good, rate of eight tons per acre; table quality fair. Reliable second crop.

Sutton's A1.—Planted 1st October; seed imported from Yates & Co., Sydney. Some of the tubers in this lot were diseased, and produced sickly, weak plants, which were taken up and burnt. Growth fairly vigorous; foliage dark green, and curled; habit upright; height two feet six inches; neat and level; flowers bright lilac. Taken up 10th January; tubers medium size (rather many small ones), round; rough skin, of a pale pink; table quality very good; fair keeper. Second early variety.

Up-to-Date.—Planted 2nd December; English seed. Three fine tubers of this variety were brought out by a gentleman from England and presented to this department for trial; one of these tubers weighed 2lbs. 5ozs.; flesh firm and healthy. I divided the lot into 21 sets; all made nice healthy plants; height two feet six inches. Taken up 13th March, giving a total yield of 56lbs. Tubers oblong; white smooth skin; shallow eyes. Main crop variety; not a very good keeper.

NOTE.—Manure applied in the drills at the time of planting at the rate of 6cwt. per acre, composed as under:—

4cwt. Superphosphate,
1cwt. Sulphate of Potash,
1cwt. Sulphate of Ammonia.

The whole broken up, fine-sifted, and thoroughly mixed before use. I have always found the above to be a reliable fertiliser for all crops if used in proper quantities to suit the requirements of each class of crop grown.

NOTES ON THE STATE FARM, HAMEL.

By G. F. BERTHOUD.

The manager of the State Farm at Hamel has sent in the following report on the work done at the farm during the month of April:—

WEATHER.—Mostly fine, with beautifully mild, warm days and cool nights, with a few light showers, but not enough to make seeds germinate freely. However, we may expect an abundant rainfall during next month.

WORK.—The State prisoners have been busy all the month doing useful work on the farm, such as clearing, fencing, draining, building new pigsties and yards, also fowl-house and run. Likewise preparing land for the fig orchard by digging, grading, etc. All sound useful employment to men serving short sentences for minor offences.

FIGS.—A consignment of valuable varieties, comprising the Capri and other choice kinds, from California. All strong young trees, which reached here in fair condition; only a few are likely to fail. They will be planted out in their permanent positions during May. Should prove useful for propagating young plants from later on.

SOWING.—Several plots of new and selected varieties of grasses and grains have been sown, and land prepared for more extensive sowing next month.

RICE AND MAIZE.—Several plots of each have been harvested, but are not yet threshed. Will give results in next report.

COTTON.—The plants have made fine but belated growth, and are setting a fair crop of well-filled bolls. Only a few have ripened. The main crop is likely to be spoiled by wet next month.

POTATOES.—The summer-planted plots will be ready for digging early in May.

New varieties, named below, were introduced from England and Scotland. All are planted on high land well sheltered from frost, viz.:—

Daniel's "Duchess of Norfolk," Finlay's "Eldorado," "Moneymaker," "Vermont Gold Coin," "Queen of the Veldt," "Dalmeny Radium," "Pink Blossom," "Dalmeny Red."

NEW ZEALAND FLAX (*Phormium tenax*).—Considerable interest has been manifested by local agriculturists, and several inquiries made here lately as to the probable commercial value of this plant for industrial cultivation in the South-Western parts of

A Piece of Black Boy Country at Cannington (By G. Oneto).

this State. I have not grown any on this place, but Mr. McFarlane, manager of the State Nursery adjoining, has the plant growing very luxuriantly along the edges of Samson's Brook. The plant appears to be at home, and thriving. It can be successfully grown easily on all low-lying lands which retain a fair moisture during the summer months, but all stagnant water should be drained off. The common or swamp variety produces a strong, coarse fibre, used chiefly for the manufacture of ropes and paper. Finds a ready sale on the English market. In its native habitat the leaves attain the height of 10 feet; here the plants do not grow as tall.

P. Colensoi is a dwarf variety, which usually grows on high land, and produces a fine, soft but strong fibre. There are several other kinds, some with beautifully variegated foliage, making fine decorative objects in flower gardens. The leaves, when torn into narrow strips, are strong and useful for tying vines, and other purposes. All the varieties are readily propagated by division of the roots.

THE ANGORA GOAT AND THE POSSIBILITY OF THE MOHAIR INDUSTRY IN WESTERN AUSTRALIA.

By F. L. FAULKNER

(Manager of the Government Experimental Farm at Narrogin).

The Angora goat industry has at last made a slight stir in Western Australia, but up to the present, unfortunately, the number of pure Angoras in this State is very small.

Last year (1904) the Agricultural Department secured about 120 good pure-bred flock goats, and after establishing small flocks at the Experimental Farms at Narrogin and the Chapman, the balance of about 75 goats (mostly bucks) was distributed amongst various applicants throughout the State.

Of course, it is extremely probable that many of these bucks will be thereby allowed to run amongst a flock of common goats, and no further attempt made to establish a good grade flock, but on the other hand many of those who have been fortunate enough to obtain the pure bucks have a few pure does, whilst others will find their way to owners of flocks of common goats who are starting grade flocks.

This system of creating a grade flock, although not of course equal to starting from the pure animal on both sides, is, under the circumstances, a good one, giving results that are astonishing, and, if carefully conducted on right lines, produces in time a flock undistinguishable from the pure breed and having the additional advantage of being more hardy and prolific.

The Angora doe is, unfortunately, not conveniently obtainable, except at very long prices, and even then only in very limited numbers, so that the only alternative, if it is desired to start on a fairly large scale, is to start grade flocks. The grade goat at the second cross often gives fairly good marketable hair; whilst at the fourth cross the animal is almost undistinguishable from the pure bred. So great is the prepotency of the pure buck that even in the first cross the kids are almost invariably all pure white, and, indeed, in some cases the hair is fairly good.

That the Angora goat is well suited to thrive under Western Australian conditions cannot be doubted, and indeed has been already proved, as they are now to be found—although, it must be confessed, on at present but a very small scale—from east to west and from north to south of the inhabited portion of the State. Those districts having a light rainfall, as, for instance, in the vicinity of the Eastern Goldfields, are, it would appear, better suited to the requirements of the Angora than the South-Western and the Southern Districts, where the rainfall is heavier, for, although this goat can endure almost any variation of temperature, it does not thrive so well where the rainfall is continuous and excessive, and where the soil is continuously moist.

The typical goat country is one where the climate is inclined to be dry and warm and the soil undulating or hilly, indeed the more rugged and rocky the better, so long as there is plenty of thicket, shrub, or tree-suckers from which the goats can pick a living. Western Australia can certainly boast of a very large extent of country that could be included under the above description, and even if the country is not all rugged and hilly, it is mostly undulating, and sufficiently rocky to keep the feet of the goats short and well trimmed back; and although as regards the vegetation there is a large proportion that the goats possibly may not do very well upon, there is still plenty of very nutritious scrub and bush which will be eaten readily in preference to the grass. This is particularly noticeable at the Narrogin Experimental Farm, where the goats confine themselves almost exclusively to the stink-bush thickets, and are doing remarkably well. Much has been said of the wonderful ability of the Angora as a scrub-clearer, but practical experience teaches that if the goats are to thrive and to give profitable clips of mohair too much of this kind of work must not be attempted. It cannot be denied that, if they are compelled to do so, they will exist on anything down to eucalypt suckers and dead sticks; but they certainly will not be profitable if kept this way.

In spite of its extreme hardiness the Angora succumbs as readily as most other animals to the effects of our Western Australian poison plants. If anything, indeed, it takes poison even more readily than sheep do, owing, no doubt, to its browsing habits, since a sheep, if it can get good grass, will forsake the scrub.

Where the tendency of the climate is to excessive wet, the Angora is liable to become infested with lice; but they are readily got rid of by dipping in any of the well-known sheep washes.

On land that is without rough hills or stones the feet of the goat are liable to become long and twisted during the wet weather, and should therefore be trimmed occasionally.

The Angora goats are, comparatively speaking, more easily fenced in than the common goat is, a 3ft. netting with a wire above usually keeping them safely; indeed, as long as they have plenty to eat and are satisfied, an ordinary six-wire fence suffices.

When disturbed they herd together like a flock of sheep, and if kept handled are fairly easy to yard. Regarding the future possibilities of a market for the produce of the Angora, it may at once be said that they look extremely bright. The world's demand for mohair of a good quality is now larger than the supply, the price being from 1s. to 1s. 3d. per pound, while even inferior half-bred hair is bringing from 6d. to 8d.

Mohair goods are noted for their wonderful wearing properties and almost indestructible lustre, and as they are rapidly gaining popularity, there is every reason to recognise that, as their manufacture develops, the demand for hair will increase proportionately. In any case there need be no fear of a glutted market for a long time to come.

The mutton of the Angora, also, is quite equal to the best mutton, and altogether devoid of the aroma which people usually associate with that of common goats. The report of the Queensland Statistician for 1903 states that Angora wethers barely two years old averaged 40lbs each, dressed.

At the Experimental Farm, Narrogin, there are now a few kids five months old that should dress up to 25lbs. each.

The skin of the Angora, again, is a valuable asset; the pelt is much tougher and stronger than that of the sheep, and the beautiful snow-white lustrous hair makes the skins, when well tanned, particularly adapted for working up into mats and hearth-rugs. A good skin should be worth anything up to 8s. or 9s.

At present much is being said and written about the quality of mohair, and buyers appear all to be desirous of getting a hair free from kemps, of long staple, and fine quality. Kemps, of course, are of no benefit to either the grower or the manufacturer, and so should be bred out as quickly as possible.

The question of length of staple is one, however, that may be looked at in two ways, as is also the one of fineness of fibre.

With good goats a long staple is not hard to obtain if the goats are shorn only once a year, but by shearing twice a year growers find that they get a much heavier total clip, although, of course, the hair is shorter, whilst the difference in price for the long hair does not compensate for the difference in weight of the short hair, in many cases.

Experience has also shown that in parts of Western Australia, before the weather becomes sufficiently warm to make shearing safe, much of the hair is lost by shearing only the once—many of the nannies bearing kids losing the whole of it. This, however, is the experience of only one season, and the goats, when they become acclimatised, will probably hold their fleece better.

As regards the quality of mohair to grow, from the manufacturer's standpoint, an endeavour should be made to produce hair of as fine a quality as possible.

From the grower's point of view, however, this holds good only to a certain extent. It would be well if growers were put on the alert and would not attempt to grow hair of too fine a quality, or, as a natural consequence, a small, delicately-constitutioned animal, with a very light clip, will be the result; whereas a good quality, strong-fibred, long, lustrous hair invariably grows on a large robust animal, which gives a heavy clip, and, when the animal is no longer required for breeding or the production of mohair, furnishes a good carcase of meat. At present it is to be regretted that most of the strains of Angora blood in this State are from the same origin, and the introduction of new blood will therefore shortly be required. Facilities for imports are, however, increasing, and as there are now a fair number of does in the State, the introduction of fresh bucks will be all that is necessary.

It is certainly to be hoped that those now venturing on this new industry will be able to carefully follow it up to a successful issue, as so many others are doing in the United States, in South Africa, and also in other parts of Australia.—*Land and Land Settlement in Western Australia, 1902-4.*

THE MOHAIR INDUSTRY.

In respect to this industry, the Tasmanian Agent General asked an English firm to express an opinion as to the value of Australian Angora goatskins and Mohair, and the following letter was received in reply:—

SIR,

ANGORA WOOL AND ANGORA GOATSKINS.

"We beg your kind reference in this connection to your esteemed favours of the 13th and 20th December, and our reports to your good self thereon of the 19th (2) and 21st *idem.*

"It is with very particular pleasure that we transmit to you an expression of opinion from one of the very largest consumers and manufacturers of Angora wool in this country, an opinion we deem of most valuable import; this, together with the appended extract from the same source, deals exhaustively with the subject under the heading of 'Climatic Influences and Quality.'

"'That we know no reason why Angora goats should not be satisfactorily introduced into Australia. It has already, to a small exent, been done; but of course the wool industry is the predominant one, and can be so satisfactorily carried on that the cultivation of the Angora may be overshadowed, and regarded as a negligible addition to the resources of stock-breeders and holders. You are doubtless aware that the production of Angora hair has become a very large one indeed in South Africa, the weight produced in the South African colonies being now considerably greater than in Asia Minor, which is the natural habitat of the Angora goat. From personal experience on the spot, I know that the growing of Mohair in South Africa is the most lucrative of all their pastoral pursuits, and promises to become a still more important source of prosperity in the future, the climate and the herbage being both well suited to these animals. The food best adapted to Angora goats is the foliage of bushy plants, of which there is certainly an abundance in Australia. They do better upon such food than upon grass, which is doubtless the reason why they flourish and develop so well in South Africa, enormous areas of which are covered with the Karoo, which is a dwarf plant producing an oily, aromatic leaf, upon which the goats thrive, and have a tendency to fatten.'

"The extract referred to (Exhibit A) is taken from a recently compiled brochure upon the origin and growth of the woollen industry, from which it is possible you may derive information which might prove of some assistance.

"In addition to the above, we now place before you a particularly able and comprehensive digest, for which we are indebted to one of the leading firms in this city:—

"'The nearest analogy to the introduction of the Angora goat in Australia is that which commenced about forty years ago, in the Cape Colony. In South Africa there was, of course, vast flocks of the ordinary goat, and in Australia the latter hardly existed—at least, not in the way they did at the Cape. The male Turkish, or Smyrna Angora, was introduced to cross with the native goat. The purpose of this was to obtain the textile called Mohair. But it was many years before a good class of hair was produced, and even to-day it does not possess (although superior in some ways) the fine silky nature of the Turkish Mohair. The skin, of course, is a bye-product, very much in the same way that the skin of the sheep is. The Cape supplies a large quantity of skins, the bulk being from one-half to three-quarters crossed, a few very recently crossed, and some as fully developed as they are ever likely to be, with hair free, long, and silky. The latter, *for leather purposes*, are at least valuable. The recent cross, which gives a skin nearest to the goat, is the most valuable for that purpose. The elements of value may be roughly approximated, as follows :—

	per lb.
Mixed hair of all lengths, either slipped from the dead skin or clipped off, is worth, dry	7d.
The good pelt or skin of the earliest cross, without hair, is worth	8d.
The cross-grained skin, obtained from three-fourths cross to a full quality Angora, is worth	5½d.

Shorn hair from live Angoras may be worth, depending on staple and quality, from 9d. to 16d. per lb. The market for Mohair is very unreliable, and is subject to rapid fluctuations. It is at present at a very moderate, even low, level. Short hair, obtained from the first cross, is not worth more than 3d. to 4d. per lb. dry; and from the second and third crosses about 5d. per lb. A Turkish skin, flint, dry and clean, in full growth, weighs about 8lbs. per skin, of which about 3¾lbs. are hair, 1¼lb. waste, and 3lbs. pelt. A Cape Angora, with dry-salted pelt, in fair condition and full growth, weighs about 6½lbs. per skin, and of this we estimate that there are 2lbs. of hair, 1½lb. waste, and 3lbs. pelt. The article when in full growth occasionally encounters a fur-trade demand, either for mats or for cutting up for cheap fur trimmings. When in such demand, the price always goes beyond the figure that can be realised from the textile manufacturer and tanner. Capes are quoted for this purpose to-day at 4s. 6d. to 5s. per skin, and Turkish 7s. to 7s. 6d. per skin. We have known the latter realise 15s. a skin. We have seen, in produce from South Australia, very fine specimens of Angora skins.'

"*Pro forma Account Sales.*—We have already placed you in possession of one of these, relating to wool (*see* our report of 19th December), and we have now pleasure in enclosing two more additional—one relative to skins (Exhibit B) and the other to wool (Exhibit C). From these, together with the information already supplied to your good self, in regard to the current rates of freight and insurance, and in conjunction with that which you doubtless possess as regards the original and f.o.b. costs in New South Wales, the necessary information can be ascertained for the formation of a rough estimate as to the probable out-turn of wool and skins in comparison; but it must be always borne in mind that, in the absence of representative samples, it is an impossibility to supply even an approximate valuation of the marketable value here of either.

"Whilst handing us (Exhibit B) account sales of skin our friends supplement it with the following information, and this also we commend to your attention.

"'There is a good demand for Angora goatskins in this country, but it is difficult to give a value without representative samples. The price on the enclosed *pro forma* account sales are those current for Angora goatskins from the Cape of Good Hope, and might be reasonably accepted as probable values of Angoras from Australia. At the present moment there is a great scarcity, and values look likely to appreciate considerably.'

"With regard to (Exhibit C) account sales of wool, we might remark that the deductions made therein from the weight of the bales are for tare, 10lbs. per bale, and draft, 1lb. per cwt.

"In conclusion, we most respectfully beg to draw your attention to an article in the *Daily Consular Report*, No. 2114, of United States of America, wherein the American Consul of Newcastle, New South Wales, contributes some very interesting remarks in connection with the present conditions and the future prospects of the New South Wales export industries, particularly wool.

"We have, etc.,
W. M. S. Selwyn,
Manager."

Pro forma Account Sales of 30 Bales Australian Angora Goatskins.

	cwts.	qr.	lbs.		lbs.			£	s.	d.
Lots 1/5.—2,500 Long-haired, suitable for mats.										
Avg. 36lbs. doz.	67	0	0	or	7,504	at 7¾d.	per lb. ...	242	6	4
Lots 6/10.—2,500 Ordinary Angoras.										
500 Large	13	1	16	or	1,500	at 6¾d.	„ ...	42	3	9
1,250 Middling	27	3	17	or	3,125	at 6¾d.	„ ...	87	11	6
500 Small	6	2	22	or	750	at 7¼d.	„ ...	22	13	1
125 Ex. small	0	3	10	or	94	at 6½d.	„ ...	2	10	11
125 Dry, dmgd.	2	0	25	or	250	at 4½d.	„ ...	4	13	9
Lots 11/15.—2,500 Clipped Angoras.										
Avg. 30lbs. doz.	55	3	6	or	6,250	at 5¾d.	„ ...	149	14	10
								551	14	2
Discount, 2½ per cent.								13	16	0
								£537	18	2

	£	s.	d.	£	s.	d.			
Freight—									
Management, rate, including landing, wharfage, housing, weighing, tarring, piling, showing, delivery, etc., 30 bales, at 4s. 9d. per bale	7	2	6						
Rent on 30 bales, at 2d. per bale per week, 3 weeks	0	15	0						
				7	17	6			
Public sale charges, advts., etc.—15 lots, at 3s. 6d. ...				2	12	6			
Fire insurance, ⅛ per cent.				0	13	9			
Brokerage, 1 per cent.				5	10	5			
							16	14	2
							£521	4	0

Pro form Account Sale of 15 Bales of Australian Mohair Wool.

	cwts.	qr.	lbs.		£	s.	d.
5 Bales A gross, 10/1 ...	15	2	14				
	0	2	10				
	15	0	4	lbs. 1,684 at 12½d. ...	87	14	2
5 Bales B „ 10/1 ...	15	2	14				
	0	2	10				
	15	0	4	„ 1,684 at 10d. ...	70	3	4
5 Bales C „ 10/1 ...	15	2	14				
	0	2	10				
	15	0	4	„ 1,684 at 8d. ...	56	2	8
					£214	0	2

Charges—				£	s.	d.			
Freight on 46cwts. 3qr. 14lbs., at 3s. 8d. per lb.	£8	4	1						
Primage, 5 per cent.	0	8	2						
				8	12	3			
Warehouse charges (consolidated rate) on bales weighing from 1½ to 3½ cwts., 4s.; from 3½ to 5 cwts., 5s. per bale				3	0	0			
Fire insurance for three months				0	5	6			
Brokerage, 1 per cent.				2	2	10			
Our commission, 2 per cent.				4	5	8			
							18	6	3
Prompt 4th January, 1904							£195	13	11

EXHIBIT A.

HISTORY AND ANTIQUITY OF MOHAIR.

"The softness, brilliance, durability, and flexibility of Angora goats' wool, or Mohair, the brightness of the colour when dyed, its long staple and fibre, are well-known facts, traceable to remote antiquity. When the Children of Israel left the slavery of Egypt, and took with them their cattle, the goats they had must have been wool-bearing goats, for Moses commanded them to bring white silk and goats' wool to weave the altar covers and the curtains for the Tabernacle (Exod. xxxv., 23). Much goats' wool must have been at hand, and of excellent quality, for we further read (Exod. xxxvi., 14), 'And the wise workmen wove 11 curtains of goats' wool, 30 ells long, four ells broad, all of the same size.' For slaughter purposes we read (Ezek. xxvii., 21), that these goats were exported from Tyre to Arabia.

"It is, however, certain that neither the Angora goat nor its wool was known in Western Europe until, in 1655, the animal was described by the naturalist, Tourneforte; but that textures of

Mohair were in use in England in the eighteenth century is obvious, by an allusion to the same in the works of Pope, our great classic poet.

"The natural habitat of the Angora goat is in the plains of Asia Minor, where its breeding has been most carefully attended to during the last twenty centuries; and still further back it is known that a fleece-bearing goat existed in the district of Angora.

"All goats delight to feed upon the foliage of shrubby plants, a considerable variety of which, of the evergreen species, luxuriates in the arid regions of Asia Minor, from which part of the world, until within recent years, almost the entire supply of Mohair was obtained. During the last 20 years the dominions of the Sultan of Turkey have found, in the Cape Colony a serious competitor in the growth of Mohair; the illimitable Karoo of South Africa is covered with a dwarf shrub, whose aromatic foliage supplies the Angora goat with food so admirably suited to its requirements that it multiplies, thrives, and fattens upon the same most surprisingly. The export of Mohair from Constantinople has been practically stationary for a number of years; but during this same period the export from South African ports has increased by leaps and bounds, until the quantity now far exceeds that from Turkey. In 1902 18,241,579lbs. were shipped from the Cape Colony, as compared with 11,518,620lbs. from Turkey.

"Since the introduction of Mohair into England as a textile raw material, market values of the same have been subject to great fluctuations, the result, doubtless, of the small supply, so when the demand for the beautiful goods made from this material has become even moderately large, the price of raw Mohair has quickly advanced to an almost prohibitive point, which has had the effect of not only curtailing the sale of such goods, but of practically making them unattainable at reasonable rates. But now that the cultivation and the breeding and rearing of goats has been taken up by the Cape Colony, whose climate and vegetation are so thoroughly suited to the constitution of these beautiful animals, it is unlikely that the supply of Mohair will, in the future, be insufficient to meet the requirements of manufacturers, and, consequently, that prices of Mohair goods will be subject to those violent fluctuations which have so injuriously affected the trade in the same in the past. Although the supply of Mohair from South Africa has increased with such rapidity, the full capacity in this development is very far indeed from having been reached."

[This letter appeared in the April issue of the *Agricultural Gazette* of Tasmania.]

FRENCH GOATS FOR SOUTH AFRICA.

"A new departure has been made in South Africa in the rural industry by the importation, through Messrs. Lewin Bros., of some French Alpine goats, with the object of establishing the breed in that country. Though locally named the Alpine goat, the variety is found over a considerable area of Southern Europe, in Corsica, in the Balkans, and in Greece. It is one of the largest types of the domestic goat, and its great recommendation is that it is an excellent dairy animal. The late Professor Sanson, in his work "Traite de Zootechnie," states that the French Alpine goat will yield two litres of milk for nine months. He gives, as an illustration, the returns from a small flock of 24 goats, the value of which—for milk and kids—was estimated at from 20f. to 30f. per head. The gross returns were set down at 2,918f., and the cost of keep, etc., was estimated at 1,898f., leaving a profit of about 200 per cent. on the capital engaged in the undertaking. In France and in most parts of Europe the milk of these goats is made into cheese, which in France is held in high estimation, and commands a good price. The returns from the industry amount to about one million francs per annum. In some regions these goats are very numerous, particularly in Corsica and Tunis. In the latter country they are said to number about 600,000. Goat-keeping in Europe is a poor man's industry; it requires only a small amount of capital to engage in it, and country that is unsuitable for other rural industries will keep a certain number of goats. How these goats will thrive in the dry climate of South Africa, and the quantity of milk they will yield, are questions that have yet to be determined. That we have a large area of land in the various States of the Commonwealth, at present giving little or no return, that might be profitably employed in goat-raising I firmly believe, and the goats lately introduced into South Africa might be tried, as well as the Angora goat. As an animal for the butcher the goat is of much greater value than most husbandmen are aware of. I have met with the statement in American papers that by many goat mutton and kid are preferred to sheep mutton and lamb. From an article in a late number of the *Journal d'Agriculture Pratique,* I learn that the improved French Alpine goats yield from 800 to 1,200 litres of milk per head per annum. Some years ago the flocks of goats in the district of Mont d'Or were greatly injured by the introduction of Cashmere goats. It was expected that a yield of fine hair would be added to the supply of milk. The result was a great disappointment, as the fleece proved to be worthless, and the yield of milk was greatly reduced. The work connected with the raising of goats is usually performed by women and children, and it is said that twelve goats will give as much milk as three cows. From the goats' milk is made a fermented drink, which is used by medical men in cases of indigestion and intestinal complaints with great success. It is also largely used in rearing delicate children."—*The Australasian.*

NOTES ON THE CHAPMAN EXPERIMENTAL FARM.

By R. C. BAIRD.

The weather during the past month, although fairly warm at times, has, on the whole, been pleasant, and towards the end of the month there were signs that the summer weather was practically over.

Ploughing was commenced at the beginning of the month, and 50 acres of land have been prepared for the rape crop. Ploughing for the general crop has also been proceeded with in No. 19 paddock. Fifty acres of this paddock having grown two cereal crops in succession; I intend to fallow that portion, with a view of sowing it in the early spring with sorghums, milletts, etc., for summer feed.

The ambercane grown in the paddock near the river, although fed right down to the stumps, has again sent out shoots, which, in the course of a week or two, will give a fair bite for stock.

A considerable quantity of artificial manures has been landed at the siding during the month. This shows that the farmers of this district are fully alive to the importance of applying fertilisers to the soil.

Ploughing is not general here, most of the farmers preferring to wait for rain.

Finding that we had not sufficient pen accommodation for the pigs, I have had several of the large pens divided and fitted with gates, shelter sheds, and water troughs. This will allow us to separate the pigs when desired, and facilitate the handling of them.

Winnowing and grading seed wheat and oats has been completed. A great many inquiries from those desirous of securing pure seed have been received, and several orders have been received for delivery early next month.

The stock, notwithstanding the fact that the pastures are becoming dry and bare, are in good condition. The young sheep have been running on the stubbles for the past month, and are greatly improved in condition.

During the next month the work of ploughing for the general crop will be continued. Drilling fifty acres with rape seed will be carried out, and a commencement made in drilling the general crop.

Potato planting for the early crop will be carried out.

The erection of fencing around the blocks of land lately cleared for cultivation, and the subdivision of one of the older cultivation fields, will be undertaken.

[EDITORIAL NOTE.—This report we received too late for the April issue of the *Journal.*]

APRIL REPORT.

The past month has been excessively dry, and occasionally fairly warm. During the last week, however, there are indications that a change in the weather will shortly take place. Rain is now badly wanted to enable the farmers in this district to start ploughing on the newly-mullenised land.

We have now about 120 acres ploughed, and hope for a break in the weather so that we may start on the newly-cleared land, which is at present very hard.

On the 10th of the month we started drilling rape seed, and completed it on the 15th. Fifty acres have been sown with this crop. The land used is part poor sand plain and part fairly good red loam, and has grown two successive cereal crops.

Fertilisers were applied at the time of sowing. Forty-two acres were treated with Abrolhos guano at the rate of 70lbs. per acre, and eight acres treated with super. at the rate of 50lbs. per acre. The ground was ploughed with the disc plough, harrowed once and rolled, and the seed drilled at the rate of 3½lbs. per acre. The method of sowing adopted was to mix the rape seed with the manure in the proper proportions, and sow all together through the manure runs. By the use of the two manures a test will be made as to which will give the best results under our conditions. The rape crop is one I should like to see more largely grown by our farmers. There is no better fattening crop for sheep, cattle, and pigs, and it can be grown during the winter months when the natural feed is scarce. I have not had sufficient experience in rape growing here to state what would be the probable results, but in the Eastern States I have seen 10 to 15 sheep per acre fattened for market.

When it is seen that such a large number of sheep can be fed on each acre, it is not difficult to understand the important manurial effect they will have upon the soil. The rape crop is valuable for its fertilising properties alone; being of the leguminous order, it has the property of absorbing free nitrogen from the atmosphere, and conveying it to the soil through its roots.

Of the grasses planted last year several of the varieties have done remarkably well, while others suffered very much from the heat of summer. *Eragrostis Silosa* grew vigorously, and kept green till the end of January. *Paspalum Dilitatum* grew well, but dried off early.

Paspalum Virgatum, a coarser variety than the *Dilitatum*, made good growth, and remained green until well into the summer. *Prairie* Grass did well, but dried off early. Wallaby Grass (*Dauthonia Pemallata*) grew vigorously, and is now starting to shoot out again. Sheep's Burnett, a very close creeping grass, has held its own through the summer. Although sheep have been grazing on it right through the hottest weather it is still green. *Kentucky Blue Grass* has not done well, but it too was closely cropped by the sheep. *West African Wonder Grass* would, I think, have shown good results, but as there were only a few plants the turkeys and poultry bestowed too much attention upon it for its good.

Five different varieties of potatoes have been planted during the month. I intend planting more after we have had some rain.

A large number of inquiries for seed wheat, etc., have been received during the month, and several deliveries have been made.

We have still some of the melons left, which we find most useful for pig and poultry feed.

The turkeys are looking well. Orders are coming in freely. We have a good number of this season's birds still for sale.

The poultry are looking well, being quite through with the moult. A few of the hens have started to lay. The poultry yard has been strengthened by the introduction of a pen each of White Wyandottes and Dorkings.

The stock on the farm are, with a few exceptions, in good condition.

The new building for the manager has been commenced, and is being pushed on with as rapidly as possible. I hope to have it completed by the end of the next month.

Operations for the next month will be principally confined to drilling the general crop, ploughing, and the erection of subdivision fences.

NOTES ON THE EXPERIMENTAL FARM, NARROGIN.

By Frank L. Faulkner.

I herewith beg to submit the report of the farm for April, 1895:—

The month opened out very favourably with a little over an inch of rain during the first week. From the 14th to the end of the month, however, no rain was recorded, and everything dried up very quickly. We had no crop sown on the farm excepting about 30 acres of rape, which has not suffered from the dry weather. Several farmers in this district who have had pieces of fallowed land have their crops already well up, but other crops that were sown just after the same rain on stubble or freshly ploughed land are not doing so well.

A few acres of barley on this farm, sown early in the month on summer ploughing, is growing quickly and looking well. In addition to the 30 acres of rape and the piece of barley we have up to date sown only about 10 acres more rape and several acres of early ripe oats for silage. Some 100 acres is now ready for sowing, and with the fine rains we are just having, seeding will be pushed on with all speed. The want of well fallowed land, which we were unable to obtain owing to lack of sufficient cleared land, is a serious drawback to our cropping—not only does it make the seeding operations slow and laborious, but the results are not nearly so satisfactory. The clearing is more advanced than I hoped for, and we have been fortunate in getting some 70 acres more ready for the plough. I regret very much, however, that we have not another 100 or 200 acres which could be ploughed up for fallow as soon as the seeding is done. Crops' account would then show a balance that would go a long way towards making the institution self-supporting. We could also show farmers and visitors the right way to work.

In the orchard and vegetable garden work has been kept going during the month. A crop of pig melons of about an acre and a-half yielded at the rate of 21 tons per acre. This was on land that at Christmas gave us a three to four ton crop of potatoes.

Later sown patches of maize have all been cut for the cows, and a portion of the early sown that was left for grain gave us some very good corn.

Vegetables are coming on quickly, and a good supply of all sorts is set out. A few cabbages that were set during the summer have, during the month, given us some splendid vegetables. Next season I hope to do more in this line during the summer months.

We have been kept supplied fairly well all the summer with vegetables, and are still working on rhubarb, parsnips and carrots, mint, and herbs; and radishes are already fit to use.

The vines look remarkably healthy, although there are a few misses in the white sand. The orchard has suffered more from the dry summer, and more spaces will require filling.

A patch of potatoes sown during March as an experiment are coming through well, and may give us a few tubers before the frost sets in badly.

The pit of silage put down last October is about half used, and, excepting for some nine inches round the sides that was spoilt owing to the rough unflushed pit wall, it is coming out excellently, and the cattle eat it readily. All the cattle have been getting a little of it during the month, and they have put on condition rather than lost it. Unfortunately all our cows are heavy in calf and dry, and as the dairy is now nearly completed, the purchase of a few good dairy cows would be a great aquisition to our stock, and would utilize the silage and the rape to good advantage.

Lambing started on the 29th of the month, and the sheep are in good condition. A fortnight ago the ewe flock was yarded, and all of them sprayed on the crutch and hind-quarters with a solution of Cooper's sheep dip. This treatment last season was very effective in preventing the flies from attacking the ewes, and as the process is very quick and easy of accomplishment, with very little knocking about of the ewes, I think it is a wise procedure for every sheep-owner at lambing time when the flies are so troublesome.

The spraying is done in the race without turning or lifting the sheep in any way. A bucket or drum containing the dip liquid (mixed as for dipping directions on the packet), and a small syringe spray pump are all the necessary apparatus; and with one man leaning over the race and using the pump, and another man to keep the sheep in position, and to rub the dip into the wool and well round the crutch and tail, the job can be got over quickly and well. Five gallons of the solution will do a hundred sheep, and 500 sheep can be comfortably got through by the two men in a half-day.

The pigs, of which we have now some 55 to 60, are practically living on pig-melons and the kitchen slops. A little crushed wheat or barley being fed to the sows carrying litters, and to the young stock. During the month we have disposed of a number of pedigreed youngsters at prices from £2 10s. to £4 4s. We have still a few to dispose of, and have a fair number of weaners and slips that will help to keep down the meat bill during the winter.

The fowls have now got mostly over their moult and are laying, but rather shyly. The hens have all been brought in from the field, culled heavily, and the pens made up from our own stock pullets, and cockerels in some instances.

We are endeavouring to get hedges and creepers started all through and over the fowl runs, as at present they are very bleak and cold in winter and hot during summer. Fagosaste, African Box Thorn, and Keynedie Nigricaus are the three chief plants that we are trying.

The well that was started in March has proved very hard sinking, the country being of tough disintegrated granite. At the 70 feet level, where a good supply of water was reported, we have only a supply of about 150 gallons per day, and we are not yet to the bottom of the bore. The depth of this trial bore was given as 70 feet, and the supply estimated at 40 gallons per hour, but a mistake has evidently been made in each case. The water is good, however, and I am in hopes that we will strike a better suppy at a few feet deeper.

Grass on the farm is everywhere coming on well, especially on the land that has been ploughed and manured.

APPLES PACKED FOR EXPORT.

By A. DESPEISSIS.

In connection with the National Show to be held at Bunbury in November next, the Wellington A. and P. Society is offering a substantial special prize for the best case of apples for export. The Secretary, Mr. W. S. Hales, will, on application, supply all information regarding conditions of entry.

As even the late apples are picked from the trees in May or the beginning of June, a long period of about five months must needs elapse between the time of gathering the fruit and the date of the Show.

In order to further the object of the Wellington Society, and to assist growers in keeping their fruit, the Department of Agriculture will undertake to store the exhibits in cool chambers at the Government Refrigerating Works for 1d. per case per week.

From several quarters I have lately received inquiries bearing on the selecting, sorting, and packing of these exhibits; and, in order that all may make whatever use of the information supplied, I would briefly suggest respecting—

(1.) *Size of apples.*—The largest fruit fails to keep, and small fruit is not attractive enough, and is hard to sell. Apples of suitable varieties, about three inches in diameter, would be found to combine good keeping qualities and good looks. They generally go about four to the pound.

(2.) *Material required for packing.*—The cases should be lined with white paper, and each fruit wrapped in soft, tough paper, with the edges twisted at the stalk end. It is not necessary to put a sheet of paper between each layer of fruit, but each wrapped fruit is put in line singly and firmly into the box. If there is a corner into which an ordinary apple will not go, do not wedge a small apple into it, but fill with white paper shavings or with wood-wool. Newspaper or printed paper should be tabooed for either lining the case or wrapping the fruit, as printers' ink is readily absorbed by the fruit, and spoils its flavour.

(3.) *When to pick and pack.*—After picking—which should be done when the fruit is well coloured, but before it becomes waxy and too ripe on the tree—the fruit is left to sweat for a few days. The stalk must not be wrenched from it, and it must not either be bruised by a fall or by the finger nails. Before wrapping, all fruit with uneven outlines or any sign of disease or of blemish is discarded, and the sorting is done according to size. Only one class of fruit, of only one quality, must be packed in any single box.

(4.) *Packing case to use.*—The bulk, if not the whole, of the consignments of Australian apples exported is shipped in what is known as the "Tasmanian apple case," which in shape and size closely resembles a kerosene case. Its cubical contents is a shade over an imperial bushel. The fact that it has only four corners instead of eight—as in the flat bushel fruit case generally used in the local fruit market—singularly facilitates the packing. Twenty-three such cases go to the ton, ship measurement. They can be packed crosswise, like bricks, without waste of space.

(5.) Are the apples packed flat, or on their sides? Are cases opened on the top, or sides?

Cases are opened on the flat, and the apples should be so arranged that on opening they present an attractive look.

The long apples, such as Cleopatras and Pearmains, should be packed with the eye downwards, so that the side of the fruit should show when the box is opened in the auction room, to exhibit its nature and quality. The round fruits, such as Jonathans and Rome Beauty, should be packed with the eye towards the side of the box, so as to show its best aspect.

(6.) *Brand.*—Should be neat and distinct. The brand should indicate, on one side, the nature, and, if possible, the number of the fruit and the quality. In addition to this, an attractive brand or trade-mark of the shipper or the grower proves a great convenience when shipping and handling stacks of cases.

In connection with the competition referred to, these points will, I dare say, carry appropriate weight with the judge, and, as soon as they have been attended to, the fruit should be despatched as directed to the Manager of the Government Refrigerating Works, and the Secretary of the Wellington P. and A. Society be notified at the same time, and also supplied with all the information required.

AMONG THE POULTRY BREEDERS AT BELMONT.

By FRANK H ROBERTSON.

Following on a recent poultry lecture at Belmont, the writer was requested to make an inspection of the poultry farms in the district. The invitation was gladly accepted, and a day devoted to the work. Starting from Perth at 9 a.m., the course laid across the Causeway, then taking the first turning to the left, known as the Guildford Road, and crossing the railway line, one soon reaches the picturesque sporting locality in the vicinity of the racecourse. Pretty villa residences, a few stores, and several small holdings, on which raising vegetables and poultry, are noticeable on either side of the road. It is some considerable time since the writer journeyed in this direction, and it is surprising to note the great increase of settlement that has taken place of late in this suburb of Perth. A start was made with the furthest away place, viz., St. Ann's Poultry Farm and Orchard, which contains about 50 acres, and is situated on the Guildford Road, about one mile and a-half from the Guildford station. It is an old homestead, the poultry department being under the management of Mr. Tipping, a thoroughly practical poultry man, who has had a considerable amount of experience in the handling of table poultry both in England and the States. He is working on different lines to other poultry farmers, his specialty being the rearing of a superior class of fowl for the table. The birds are killed and dressed on the premises, and sold direct to private customers at top prices. In addition, breeding pens are kept of Plymouth Rocks, Buff Orpingtons, Pekin and Indian Runner ducks.

This is an ideal spot for poultry raising on a large scale, as the natural conditions supply every essential requisite for the successful rearing of poultry. There is any amount of splendid tree and scrub shade and shelter; the soil being rich, abounds in animal food in the form of grubs, worms, and insects, also any amount of grit. Water is laid on all over the place, and the duck pens run into a creek, where a fine flock of Pekins were disporting themselves in a very happy manner. Many of the fowls roost in the trees scattered about, in flocks, in various parts of the grounds; and for the breeding pens good, substantial iron houses have been erected, each provided with a scratching shed. The incubator-room is in the basement of the residence, well ventilated and cool in hot weather; the machines consist of one Cyphen and two Twentieth Century. This farm has only been recently taken in hand by Mr. Tipping, and with further development is capable in a year or two of becoming a very extensive establishment, as the natural conditions could not be better.

Coming along the main road, a short distance towards Belmont, we arrived at Mr. E. Standing's place, a 6-acre block containing poultry raising and vegetable growing.

Egg production alone is what Mr. Standing goes in for, and intends breeding nothing but pure White Leghorns of a utility type, showing not forming any part of the business. The pens, three in number, consist of one 2 acres, and two 1½ acres each, and are situated on land thickly covered with small tree growth, consisting mostly of wattles. The fowls are not permitted to roost in the trees, but are kept in fowl-houses, so that the manure may be all secured. The main fowl-house, which is built of corrugated iron, is 25ft. long by 6ft. deep and about 8ft. in front; the slope is to the back, the front being wire netting. Perches are not more than 2ft. high and easily movable, and accommodate now 110 birds. No cockerel pens are kept, as they are all sold off for table when about four to five months old. The coming season, however, all male birds will be disposed of at low prices, as soon as their sex is distinguishable, Mr. Standing being of opinion that it does not pay him to keep them any longer than he can help. Last season 96 cockerels were sold in the markets at prices which just about paid for their feed. All the hatching is done under hens; the chickens are enclosed in small wire-netted runs about 18 inches high, 7 feet long, and 2 feet wide, and covered over with wire. These runs are a good idea and very simply made by driving a few stakes into the ground and running the wire around them. The hen is kept in a butter box turned upside down, with half of one side of the box cut out.

Going about a quarter of a mile further along the road, comes the residence of Mr. E. A. Whitchurch, who is not settled on the land for a living, but goes to business daily at Midland Junction. On his two-acre block fruit trees are growing, also bee-keeping is indulged in. There is a flock of about 100 head of poultry, nearly all Black Orphingtons, of a good useful type. A nice lot of birds were reared during the past season, just the right stamp of bird to go in for, where all-round qualities of egg production and table are so admirably blended. A pen of Indian Runner ducks are also kept. Mr. Whitchurch makes his own incubator and brooder, and the existence of the fine flock affords the best possible proof of the efficacy of the machines.

Following the road homewards until opposite the Racecourse Hotel, turn down Hardy Road, and first turning to the left is Wallace Street. Here is situated the ten-acre block of Mr. W. Skinner, who has only been resident on the spot 18 months. He has one-and-a-half acres in cauliflowers, which are doing wonderfully well, having plenty of water from permanent springs. The breeds of poultry gone in for are White Leghorns and Black Orphingtons, also a nice lot of cross Minorca and Orphington pullets. The fowls are well looked after and have plenty of free run. Mr. Skinner is well satisfied as to the profitableness of poultry keeping. From 60 hens last year for four months, they made a clear profit of 10s. a week after paying for feed; 160 chickens were also hatched during the same period.

The next yard visited was that of Mr. D. Cardie, Belgravia Street. The flock here is not a large one, but they are well kept, and among them some nice Brown Leghorn hens and pullets. An Old English Black-red Game cock in grand fettle attracted my attention; this breed is now very scarce in this State, and it is a pity that the grand old game fowl has so few supporters. Mr. Cardie purposes taking up land and going into poultry rearing on a larger scale.

A little further along the main road is Mr. James Gibson's property, the lower portion of which is let as a flourishing market garden. The house and fowl runs are on the high land. Andalusians and Rouen ducks are the two principal breeds gone in for, and among them are some very nice specimens of both varieties.

On the opposite side of the road stands the Sandringham Hotel, the proprietor of which (Mr. Donaldson) has made a good start in breeding Silver Wyandottes. A neatly-constructed row of pens has been erected, all of which contain choice specimens of this popular breed. A start was only commenced last season, when good prices were paid for prize winners from shows. The locality is a good one, affording ample range, and with the quality of the present stock the grounds attached to the hotel will probably in the near future have the naturally picturesque surroundings considerably enhanced by the presence of a large flock of these lovely black and white beauties of the feathered tribe.

The last farm inspected was that of Mr. S. Craig, situated at the end of Belmont Avenue, about a mile off the main road. This is a fine property of 24 acres, originally taken up by its owner some 10 years ago. The low-lying lands are laid out as a market garden, growing all kinds of vegetables. There is also a fine patch of lucerne thriving well. Poultry raising is gone in for extensively, and at the present time there are about 500 head scattered over the property. All over-crowding is strictly avoided, as the birds are farmed out in different mobs, which do not intermingle. Large breeding pens are laid out in the scrub land on the high ground, the natural growth of timber and shelter being left. Both housing and tree roosting systems are adopted, and a large number of young stock remain where they were reared, among the tomato vines, the fruit of which, being now comparatively valueless, is much appreciated by the fowls. Many of the birds are common or cross-breds; in addition, the following pure breds are kept, viz., Silver and Golden Wyandottes, Minorcas, and White Leghorns, among them being some very nice birds. In addition there is a fine flock of dark Muscovy ducks, and some turkeys, which do very well here. Mr. Craig finds poultry raising pay him handsomely, and purposes effecting several alterations, including the erecting of more breeding pens, with the object of increasing his stock of laying hens to eight or nine hundred.

Taking the Belmont district as a whole, it must be considered admirably adapted for poultry farming in every respect. The soil is of a light sandy nature, an ample supply of water is obtainable without deep sinking, the low-lying lands grow a splendid supply of greenstuff; the natural growth of scrub and small trees is all that can be desired, and its proximity to the city—which is only from 4 to 6 miles along good roads—is another important matter. As to the stock kept on the places visited, few high-class show birds are to be met with, but as good useful birds they are a fine lot, well kept and quite free of lice and tick, and hardly an ailing fowl to be seen in any of the farms above described.

Poultry farming in this district is in the hands of men who take an interest in their stock, and, although all food is bought, they make it pay well. Most of the holdings are comparatively new, so that in a few years' time the out-put of poultry products from the Belmont district is likely to assume very considerable dimension. Everything is going along in a very satisfactory manner now, but I would just mention one word of warning, and that is, do not let the ground get tainted from over crowding.

POULTRY SHOWS.

All the poultry societies in various parts of the State are now hard at work making preparations for their annual exhibitions, and between the dates of 9th and 10th June and 20th and 21st July no less than eight shows are crammed into that short period, as will be seen from the list below. The question will, of course, naturally occur as to the reason of so much showing in such a short period. It is because the birds are looking at their best at that time, and the degrees of quality having been settled by the competitions, the birds are then placed in the breeding pens, where they should remain undisturbed.

The first schedule to hand is that issued by the newly-formed Subiaco society. This is their first show, and the band of committeemen having for months past been working hard to make the event a success, a classification is announced of 142 classes, which, in addition to all the popular breeds, includes many which are not so well known, such as Australian Game, Anconas, Campines, Faverolles, table classes, and Capons. There is also a Novice Class for birds which have never competed in any show, entered by persons who have never won a prize.

Residents in the country districts can send their poultry, addressed to the secretary of the show, Subiaco station, where a carrier will be in attendance to meet the exhibits, which are then taken to the show, penned, fed, and watered whilst at the show, and returned free of all charges. Returned exhibits also do not pay railage back.

The entries close on Saturday, 3rd June, at 10 p.m., with the hon. secretary, Mr. Edward Austin, Hensman Road, Subiaco, from whom schedules and entry forms may be obtained. Messrs. Cairnes Candy (Fremantle), W. C. Byass (Perth), and J. A. Maddison (Rokeby Road, Subiaco), can also receive entries.

LIST OF FORTHCOMING POULTRY SHOWS.

9th and 10th June	Fremantle.
16th and 17th „	Subiaco.
28th, 29th, and 30th June, and 1st July ...	Perth.
4th and 5th July	Boulder.
7th and 8th „	Kalgoorlie.
14th and 15th „	Coolgardie.
14th and 15th „	Claremont.
20th and 21st „	Albany.

KEEPING FOWLS IN HEALTH.

While the profits of poultry keeping remain a highly debatable topic, there are no two opinions to the fact that a profit can only be made as long as they keep in perfect health. Recently the more common ailments poultry suffer from have been briefly touched on in these columns, and, remembering the saying that

PREVENTION IS BETTER THAN CURE,

a few general remarks on keeping fowls free from disease may be timely.

Originally, there is no doubt, fowls were remarkably healthy, but years of domestication and inbreeding have rendered them somewhat susceptible to disease. It must be remembered that they are kept under as artificial a manner, in their way, as a dairy cow or draught horse, and certain rules must be scrupulously followed, neglect of which will bring disease upon them. Of all the fowls the birds that have a free run of a farm-yard are the healthiest and least likely to develop ailments, for no fowls live in a more healthy and natural way. They have ample space, ample shelter, pick up no small portion of their food from the ground they range over, and get plenty of green food. But occasionally, in spite of all these advantages, disease appears, and therefore the following notes are applicable to birds under all conditions:—

SHELTER.

The chief requirement poultry need for their well-being is ample shelter from wind and rain in winter, and shade from the sun in summer, and it is because the fowls having the run of a farm-yard have these that they generally do so well. But an increasing proportion are now being kept on grass runs, behind wire netting, with a poultry house to sleep in, and nothing besides. This is not enough; they need day shelter as well as night shelter, and fowls in confinement do not always get this—not, at least, to the extent necessary for them. It is the nature of fowls to sleep part of the day in as sheltered a place as they can find, and they seldom, if ever, use the sleeping house for that purpose. While they are moving about they keep themselves warm, but when they stand still, if they are exposed to the cold, they get chilled, and the egg return suffers. But it is not only from cold they need shelter; wind is equally bad, and in summer they need shelter from the sun. The day shelter, in fact, is of equal importance the whole year round.

The shelter should be open only on one side—the south for choice, or whichever is the least exposed quarter, for the floor must always be dry, covered to the extent of some inches with dry earth or ashes for the birds to dust themselves in. Not only does the dust both keep the birds free from vermin, but it amuses them for the hour together, and prevents, in the case of birds kept in close confinment, vices like feather eating or egg eating appearing. Perhaps the greatest advantage of a shelter attached to the poultry house lies in its keeping them dry in cold and wet weather and cool on hot days, and its extra cost is repaid in the higher return of eggs.

VENTILATION.

No less than ourselves do fowls need fresh air to keep in health, and, owing to neglect of this, many an attack of roup has broken out and played havoc with the poultry. Nor do all poultry keepers recognise the difference between air and draughts for the fowls, though sensitive enough in their own person. When a fowl comes back from a show with incipient roup (far from a rare occurrence), it is the draughts that the luckless bird has endured that are, in the majority of cases, the cause. Some poultry keepers appear to think, because a fowl can sleep out of doors right through a winter, and take no harm, that a draughty poultry house makes no difference one way or another. Nothing is further from the truth. Every poultry house should be well ventilated, yet without being draughty.

GRIT.

The importance of grit for poultry has been for some time recognised by owners. It took a long time to do so. Some obstinate individuals declared it quite unnatural for a fowl to swallow pounded flint stone; their fowls never had any, and did well without it, and so forth; but when poultry run on a certain area of ground they find at first a certain amount of grit for themselves. After a while the natural grit is all finished, and the fowls need more, and unless moved to fresh ground carrying natural grit, will die for the want of it. This the critics of the need of supplying grit to fowls presently found out. For chickens especially grit needs to be provided, unless the coop or rearer stands by the roadside, thus enabling the chickens to pick it up for themselves. The best grit is pounded quartz, which can either be bought ready prepared, or else the poultry keeper can buy a "smasher," and make his own, the latter way, of course, being the cheaper in the end.—*Australian Farm and Home.*

PHILOSOPHY OF HOEING.

The hoe is amongst the most important of the weapons the gardener uses in his combat with the hosts of forces that sometimes seem to rise up against him. The effects of hoeing fall under three main heads. Air is introduced, the movement of water is modified, and the soil particles are broken up. Each of these means more than is evident at a first glance, and a little consideration may profitably be given to the subject.

INCREASES THE AIR IN THE SOIL.

Hoeing alters the air capacity of the soil in much the same way as working a concertina changes the capacity of its bellows. When the particles are pushed closely together air is expelled; when they are separated fresh air is drawn in. Experiments made with sand have shown that the volumes of air brought into play are very considerable, and much greater than would *a priori* be expected. Nor is the benefit confined to the layer of soil actually stirred. The soil for some distance beneath participates, and aeration proceeds to an appreciable depth. The air in unstirred soil, even near to the surface, is very impure, containing 50 to 100 times as much carbonic acid as ordinary air. With constant change there comes a great improvement.

It is not necessary to insist on the vital importance of fresh air to every part of the plant. Every gardener learns it by observation or by sad experience; and it becomes the corner-stone of his gardening doctrines. But the help of his invisible friends among the soil bacteria depends, if anything, to an even greater extent on an adequate supply of oxygen. Some of these minute organisms vigorously break down the organic matter which would otherwise tend to accumulate and make the soil unfit for plant growth. Others change the nitrogen compounds from forms more or less useless to plants into nitrates, bodies readily capable of assimilation. Others, again, perform a feat which chemists are now trying to emulate, and convert free nitrogen from the air itself into nitrates. These wonderful helpers require no special assistance. Air, moisture, and proper temperature are all necessary, and the happy combination is brought about by frequent hoeing.

The formation of nitrates involve the addition of oxygen to nitrogen, or a nitrogen compound. If hoeing be neglected, the supply of air is diminished, and bacteria are not only prevented from making more nitrates but some of them may finally, in extreme cases, even be driven to obtain the oxygen they need from the nitrates already built up. All their useful work is destroyed, just as the utility of a hive of bees vanishes if the bees live on the honey they have accumulated. Their good offices, in fact, depend completely on the quantity of air they receive.

Quite apart from the bacterial action, chemical changes requiring oxygen, and apparently sunlight, go on in the soil. Experiments are still being made on the subject, but it would seem from all that is known at present that oxidation plays an important part in keeping up the fertility of the soil.

HOEING CONSERVES MOISTURE.

Another of the three main classes to which the effect of hoeing may be referred is the alteration of the movement of water in the soil. Water rises to the surface from the water level in the same way and in virtue of the same force as oil rises in the wick of a lamp. Compacting the soil up to a certain extent facilitates this rise; loosening the soil checks it. The part of the soil most under the action of the hoe is therefore cut off from its source of supply, and rapidly loses water. A dry layer is thus formed, which has only a very limited power of drawing water from the moister part below, but which protects the part from the drying action of the sun and wind. Hoeing thus conserves the water in the soil; and the importance of this is evident when we bear in mind the fact—always fully realised—that the rainfall is often not sufficient for the production of maximum crops. On soils which are not too heavy it is good practice to have recourse both to the consolidating and loosening effects—to have the soil firm below in order to secure a constant supply of water to the root, and loose for the top inch or so to furnish a sufficient protection.

TEMPERATURE OF SOIL INFLUENCED.

The temperature of the soil is regulated more by the water it contains than any other factor, except, of course, the sun. Water takes up about five times as much heat in getting warm as an equal weight of soil, and the best means of warming soil is to dry it. This explains why seed beds have to be so carefully prepared for small seeds like onions; the preliminary stirring and breaking up into fine particles dries and so warms the soil. But the seeds must have water, and the bed has to be stamped or rolled to draw the water up. The gardener's instinct is wanted to decide exactly how far these two processes must go, and not unusually cottage gardeners judge a man by his onion bed. It is a common belief that hoeing lets the warm air in, and so warms the soil; but this is only true to a very limited degree. The correct explanation is that the air dries the soil, and a day's sunshine heats dry soil much more than it does wet soil.

The greatest loss of heat, however, is brought about by the evaporation of water from the soil, and the pernicious effects of ground draughts are largely due to this cause. The mulch obtained by hoeing is an excellent protector, and further helps to keep the well-hoed soil warm.

HOEING IMPROVES SOILS.

A further effect of hoeing is to improve the mechanical condition of the soil. After a shower of rain the clods can readily be broken, and if the surface is kept well worked they do not reform. Only in this way can "steely" land be dealt with and made to give a good tilth. As the soil particles become smaller their total surface increases, and a twofold improvement sets in—the water capacity and the power of retaining soluble manures both increase. Water and soluble salts are alike retained at the surface of the soil particles. If, on the other hand, the soil is already so fine that water will not readily pass through (as in the case of clay) the structure becomes coarser.

The effect of hoeing at different seasons of the year may be considered. In early spring the surface soil is disconnected from the moist soil below, air is introduced, and the top layer dries. It is now more readily warmed, and becomes suitable for seeds. The drying effect must for a time be counteracted by rolling to secure a continuous supply of water for the seedling. Later on, when growth starts, further effects come into play. Not only is the temperature of the soil raised for the two reasons already mentioned, but the air necessary for the young roots is driven in, and their development thus facilitated. Water is conserved, and the store available for the plant increases. The action of bacteria is promoted, and the continual breaking up of the soil increases the power to hold water and plant food, and prevents the latter from being washed away by heavy rains. All the causes co-operate to produce vigorous growth.—*Australian Farm and Home.*

FUMIGATION TABLE FOR ORCHARD WORK.

By T. HOOPER, Chief Inspector.

Fumigation table for deciduous trees only, during winter. The width and height and cubic capacity given represents that of a cylinder; that is, upright sides and flat across the top; therefore allowance must be made for any serious sloping away of the tent from that shape.

Take the measure after the tent is on the tree.

Width in feet.	Height in feet.	Number of cubic feet.	Cyanide (98 per cent.) Weight in ounces.	Sulphuric Acid. Fluid ounces.	Water. Fluid ounces.
2	3	10	⅓	1	1
2	4	13	⅓	1	1
2	5	16	⅓	1	1
3	3	21	½	1	1½
3	4	28	½	1	1½
3	5	36	⅔	1½	2
3	6	43	¾	1½	2
4	4	50	¾	1½	2
4	5	63	1	2	2¾
4	6	75	1¼	2½	3
4	7	88	1½	2½	3½
4	8	100	1½	2½	3½
5	5	98	1½	2½	3½
5	6	118	1¾	3	4½
5	7	138	2	3½	5
5	8	157	2½	4	6
5	9	177	2¾	4½	6½
5	10	197	3	5	7
6	6	170	2½	4	6
6	7	198	3	5	7
6	8	226	3½	6	8
6	9	255	3¾	7	9
6	10	283	4¼	7½	10
7	7	270	4	7	9
7	8	308	4½	8	11
7	9	347	5¼	9	12
7	10	385	5¾	10	14
7	11	424	6½	11	15
7	12	462	7	12	16
8	8	402	6	10	14
8	9	453	6¾	11½	16
8	10	503	7½	12½	17
8	11	553	8	14	19
8	12	603	9	15	21

FUMIGATION TABLE FOR ORCHARD WORK—*continued.*

Width in feet.	Height in feet.	Number of cubic feet.	Cyanide (98 per cent.) Weight in ounces.	Sulphuric Acid. Fluid ounces.	Water. Fluid ounces.
9	9	573	8½	14½	20
9	10	636	9½	16	22
9	11	700	10½	18	24
9	12	764	11	19	26
10	10	786	11½	20	27
10	11	865	13	22	30
10	12	943	14	24	33
10	13	1,021	15	25	36
10	14	1,100	16	27	38
11	11	1,046	15½	26	36
11	12	1,141	17	28	40
11	13	1,236	18	30	43
11	14	1,331	20	34	46
12	12	1,358	20	34	46
12	13	1,471	22	37	51
12	14	1,584	23	40	55
12	15	1,697	25	42	59
12	16	1,810	27	45	63

APIARY NOTES.

By JOHN SUTTON, Bee Expert.

Since April report, which referred to trouble in the district of Albany, a thorough and close inspection has been made, and foul brood was found in evidence to an alarming extent.

Some time ago, when in this district, I urged bee-keepers to endeavour to set their house in order, or, in other words, warned them that unless they gave close and prompt attention to the requirements of their bees they might expect trouble. Those alive to the position gave heed to the advice given, and have endeavoured to keep their stocks strong and their hives clean, but others have gone on in the old slip-shod way, leaving the bees to work their own ends, with the result that disease in its very worst form has now to be contended with all over the district.

The scourge promised fair to become an epidemic, but prompt action has to some extent put a check upon its spread, at least for the time. While a good number have been found and dealt with there is still considerable danger yet ahead, because while those under treatment are in the midst of careless persons and unknown to us who have disease in their hives, and until those are located and seen to, we cannot hope to get the district clean.

Now the winter season is upon us care must be taken to see that every weak hive is protected from robber bees.

While there is without doubt almost all the year considerable blossom and plenty of nectar available so that the bees may work on every fine day, even during the winter season, still where a weak hive is left unprotected, these flying bees will make a raid at every opportunity.

Those that have been treated should be fed freely, and every assistance given them at once, but even this should be done with care and discrimination. Don't feed honey or honey syrup. Two of best white sugar to one of water, with a pinch of salt and a little vinegar, and thoroughly mixed, and if it can be fed warm all the better.

The best feeder to use is the Boardman, as this can be placed at the entrance and secure from outside or stray bees, and no need to open the hive.

Providing there is plenty of food within and the hives are secure and snug, the less bees are disturbed the better they will winter, and on this depends the success or otherwise of the bees next spring.

[EDITORIAL NOTE.—We will be glad if any person or persons in the district of Albany who are keeping bees and have not had a visit from the inspector will send their name and address to the Director of Agriculture.]

THE DISEASES OF BEE LARVÆ.

Prof. F. C. Harrison, in the *Canadian Bee Journal* of recent date, says that the diseases of the larvæ of bees may be roughly divided into two groups, one in which the disease is contagious, and the other in which the disease is not due to a special virus, but to some physiological or physical cause. The contagious diseases are the most harmful, as they spread from hive to hive, and from one apiary to another, often producing a severe epidemic.

In all cases of infectious diseases there must be present a virus, or living organism, which may be a fungus or a mould-like growth, or due to minute organisms, which are popularly called bacteria. These micro-organisms may be carried from one hive to another in many different ways, and the following are the principal means by which contagion is spread and infection caused:—

(1.) Bees entering wrong hives.

(2.) Bees robbing a diseased colony.

(3.) Feeding bees with honey from an infected hive.

(4.) Inserting diseased combs into healthy hives.

(5.) Using as a foundation a wax from a diseased colony which has been improperly boiled.

(6.) Transferring bees into hives that have been inhabited by a diseased colony without first thoroughly disinfecting it.

(7.) Placing a hive upon a stand previously occupied by a diseased colony.

(8.) The handling of healthy colonies by the bee-keeper after manipulating diseased hives.

(9.) The introduction of a diseased queen.

(10.) Healthy bees visiting flowers which may have been infected by diseased bees.

All these are means by which infection can be carried or transferred from one place to another, and evidence can be brought forward to show that disease has been produced by each of the different means above-mentioned. Foul brood, being the infectious disease which is best known, naturally affords more examples of these methods of transmission than any one of the other contagious bee diseases.

It is important that all bee-keepers should clearly understand these means by which infection is carried, also they should have a knowledge of the appearance of the various diseases of bees, so that they can diagnose or tell the kind and character of the disease in order to apply intelligently methods of prevention or cure.

The larvæ attacked by *B. alvei*, the cause of foul brood, may die during all stages of their development. In every instance the larvæ lose their white and glossy appearance when suffering from the disease and turn to a dull yellowish, and later on to a brownish colour. In the further progress of the disease they die and collapse into a darkish brown, coffee-coloured, more or less tenacious, shapeless mass. This mass is characterised by its viscid character, and before it dries up can be drawn into threads when lifted with a match or pointed instrument. It has an offensive odour, which is said to resemble that of glue, and, when much disease is present, there is an ammonia-like smell. The cap of the larvæ sinks and appears concave, instead of being convex or flat, and it is often perforated with a small hole near the centre. Often the appearance of this sunken cell is the first indication of disease noticed by the bee-keeper. The decomposed larvæ gradually dry up and ultimately form a dry, black, or deep brown crust at the bottom of the cell.

As the disease advances, the offensive odour pervades the hive, and when the infection is spread over a great number of brood combs the smell may be noticed some distance away. The bees become more and more despondent and ultimately succumb, or in some cases desert their hives. The disease should be stamped out at the start.—*The Rural Californian*.

THE GOVERNMENT LABOUR BUREAU.

REPORT FOR APRIL.

Mr. J. B. Hitchins, Acting Superintendent of the Government Labour Bureau, has forwarded to the Minister for Labour the following report on the work of the bureau for the month of April: -

PERTH.

Registrations.—The total number of men who called during the month in search of work was 691. Of this number, 424 were new registrations and 267 renewals, *i.e.*, men who called who had been registered during the year prior to the month of April. The trades or occupations of the 691 applicants were as follow:—Labourers 207, farm hands 63, handy men 60, handy boys 47, bushmen 44, cooks 29, hotel hands 22, carpenters 15, gardeners 15, grooms 15, horse-drivers 14, painters 14, miners 11, clerks 9, grocers 8, yardmen 7, kitchenmen 6, fitters 5, station hands 5, bakers, dairymen, engine-drivers, gardeners (market), plasterers and stewards 4 of each, and 71 miscellaneous.

Engagements.—The engagements for the month numbered 222. The classification of work found was as follows:—Labourers 51, farm hands 50, bushmen 24, handy men 17, handy boys 13, woodcutters 11, gardeners 6, yardmen 6, boys for farms 4, cooks 4, dairymen 4, carpenters 3, canvassers 3, carpenters (rough) 3, bricklayers, drivers, kitchenmen, orchardists, plasterers and well-sinkers 2 of each, and 11 miscellaneous.

FREMANTLE.

Registrations.—The applicants for work numbered 187. There were 148 new registrations, and 39 renewals.

Engagements.—The engagements numbered 21, classified as follows:—Labourers 16, handy men 3, carpenters and dairymen 1 of each.

The female servants who called numbered 11. There were no engagements.

KALGOORLIE.

Registrations.—The new registrations for the month numbered 94, and the renewals 21.

Engagements.—The engagements numbered 11, classified as follows:—Labourers 4, woodcutters 2, boiler-makers, engine-drivers, fitters, gardeners, and handy men, 1 of each.

The female servants who called numbered 12. There were no engagements.

CUE.

There was one applicant for work, and no engagement.

WOMEN'S BRANCH, PERTH.

Registrations—There were 190 women called in search of employment, 103 being new registrations, and 87 renewals.

Engagements.—The engagements numbered 83, classified as follows:—Generals 21, laundresses 20, useful girls 12, charwomen 5, cook-laundresses, cooks, waitresses, housemaids, 4 of each, housekeepers, nursemaids, and light generals, 2 of each, lady helps, laundry housemaids, and wardsmaids, 1 of each.

GENERAL REMARKS.

The number of men who called at the central office, Perth, during the month was 691, being 48 in excess of the number for the month of April last year. The engagements totalled 222, being eight more than the number for April last year. There were 50 farm hands engaged during the month, which is the highest monthly total since the inauguration of the bureau, the wages offered being from 20s. to 25s. per week and keep, though there were few engagements at £1. There appears to be an impression amongst a certain class of employers that men out of work will, or should, accept any rate of wages offered. Such employers, offering little more than a bare subsistence wage, are disappointed in getting men or good men. As good a class of workers can, however, be obtained at the bureau as outside of it, if a fair rate of wages is offered. All classes of men, including new arrivals seeking employment, register at the bureau.

An effort is being made to make known the fact that female servants, as well as men, can be obtained at the Kalgoorlie Branch. It is to be hoped that employers will make known their wants to the office, when every endeavour will be made to supply their requirements. The number of women who called at Perth was 190, being six in excess of the total for the corresponding month of last year. The engagements numbered 83, being one more than the total for April last year.

INSECT AND FUNGOUS PESTS.

By FREDERICK LOWE, Assistant Government Entomologist.

Before commencing my duties as assistant to Mr. Geo. Compère, under "The Insect Pests Amendment Act, 1898," I think I may be pardoned for presenting my credentials, which, I trust, will satisfy my readers that I am qualified to undertake the work placed in my hands. Twenty-one years constant work at Entomology, in the first place, at the British Museum, Natural History, for early training under the leading Entomologists of the world; then access to the world-famed Museum and Library of the Hon. Walter Lionel Rothschild, and the advantage of his teaching; after, for a decade, with the Master of the Gardeners' Company, and Chairman of the Fruit Section of the Royal Horticultural Society, where I became familiar with the diseases of fruit and the methods for their prevention and eradication, receiving my instruction in theoretical and practical fruit growing, meantime taking certificates in Agriculture, Botany, etc., and, latterly, as Assistant to Prof. F. V. Theobald, Official Adviser to the Board of Agriculture (London). I had to deal with pests of the Farm, Orchard, and Garden, Home and Foreign, and undertake the actual work for their suppression. Colonies of beneficial insects, both parasitic and predaceous, have been in my charge to breed and distribute. Lectures and demonstrations have been given in the preparation and application of remedies for Insect and Fungous Diseases, also the effect of the disease and remedy on the tree or plant.

The introduction into this State of the natural enemies of the Insect Pests marks a great advancement towards the end every grower desires, and by a proper provision for their reception, observation, breeding, and careful distribution, has added largely to the wealth of the State in an unobtrusive manner, and, in the future, the State will, as their numbers increase, increasingly benefit by their introduction. Owing to the small number of Economic Entomologists who have given the attention and study the proposition demands, it happens that California and Western Australia are in the van in this particular work. Yet, so it is, the Eastern States would benefit more by the introduction of the Codlin Moth Parasite than even California, where our Entomologist has recently successfully introduced it; moreover, we should be spared their cry, because, thanks to our vigilant Port Inspectorial Staff and the prompt treatment of escapes by Mr. Tom Hooper, we do not allow them to dump it here.

Beyond doubt, evidenced in many orchards, and borne out by my observation and the reports of the Chief Field Inspector, where a proper distribution has been made, nothing could be more satisfactory than the work of the introduced Black Scale Parasites, Predatory Lady Birds, and others.

The loss from the Fruit Fly yearly is appalling. The methods in force for its check, while operating to some extent in one orchard, in the next failing altogether to lessen the loss it occasions; and, in spite of the Act, the pest spreads every year, infecting more orchards.

A detailed report is in course of preparation on the work of the introduced beneficial insects generally, and particularly for the past season. It will give the life, history, and method of work, also a map and list of orchards where our friends are established.

The Insect House contains upwards of 2,000 Fruit Flies reared from the two dozen or so cases of infected fruit sent in, and thousands of the pests are available in every stage of its life, ready for the natural parasite Mr. Compère discovered in Brazil, and which he will bring here by the end of this month. Everything at present seems against the introduction of this parasite, but Mr. Compère has succeeded with others, and it is my firm opinion he will be successful in the end, when we obtain the necessary paraphernalia.

Since my return from a rush round the South-Western Division of the State, I have had the Fruit Fly under observation from daybreak to dusk, and have worked out its life history in detail. This will be published at the same time as an account of its parasite, and should prove of more lasting value than if culled from a contemporary account of its life history beyond seas, as it will be from practical and not theoretical experience.

INSECT PESTS AMENDMENT ACT, 1898.

(Section 7; Clauses 1, 2, and 3.)

Department of Agriculture,
Perth, 5th May, 1905.

It is hereby notified, for general information, that the Hon. the Minister for Lands has declared the following orchards and contiguous land to be infected places on account of being infected with the codlin moth larvæ:—

Orchard situate at Parade Street, Albany, area about ¼ acre, being part of Lot 175, and occupied by Mr. J. Green.

Orchard situate at Serpentine Road, Albany, area about 2 acres, being Lot 36, named Annesfield, and occupied by Mrs. Mary Gregson.

Together with the contiguous or surrounding area of land comprised within the boundaries of the Municipality of Albany.

C. F. CHAPLIN,
Director of Agriculture.

5th May, 1905.

TASMANIAN OPINION OF CODLIN MOTH PARASITE.

At a meeting of the Executive Committee of the Council of Agriculture, Tasmania, held in Hobart on March 20th, Mr. Lea, the Tasmanian Government Entomologist, reported on the question of introducing Codlin Moth parasites from Victoria to destroy the pest and said that he had little faith in the efficacy of such a step being taken; also that a similar opinion had been received from Mr. French, the Victorian Government Entomologist, who counselled the use of a good spray pump.

[EDITORIAL NOTE.—Evidently neither of these Entomologists have kept in touch with the experiments so satisfactorily made in California, through the agency of Mr. Compère, the West Australian Government Entomologist, and which are now being made in this State, under the Assistant Government Entomologist, Mr. Frederick Lowe.]

APRIL POPULATION RETURNS.

INCREASE OF 1,339 FOR THE MONTH.

The addition to the population of the State during April was 1,339, made up of 554 males and 785 females; while the estimated figures for the whole State at the end of the month showed 147,632 males and 100,489 females, totalling 248,121. The increase continues to be made up almost extirely by excess of arrivals over departures. Appended are the details:—

MONTH.

—	Males.	Females.	Total.
Estimated population on March 31 (exclusive of full-blooded aboriginals) ...	147,078	99,704	246,782
BIRTHS AND DEATHS.			
Births registered	311	287	598
Deaths registered	173	83	256
Excess births	138	204	342
IMMIGRATION AND EMIGRATION.			
Arrivals by sea	1,569	1,155	2,724
Departures by sea	1,153	574	1,727
Excess arrivals	416	581	997
Net increase population	554	785	1,339
Estimated population on 30th April ...	147,632	100,489	248,121

The following return shows the number of arrivals in and departures from all ports of the State for the month ended 30th April:—

—	Arrivals.			Departures.		
	Males.	Females.	Total.	Males.	Females	Total.
Adults ...	1,363	943	2,306	1,010	498	1,508
Children ...	206	212	418	88	49	137
Totals ...	1,569	1,155	2,724	1,098	547	1,645
Excess arrivals	471	608	1,079			

MONTHLY INCREASES.

The appended table shows the population totals at the end of each month from April, 1904, to April, 1905:—

Month.	Males.	Females.	Total.
1904.			
April	140,037	93,657	233,694
May	141,386	94,707	236,093
June	142,496	95,507	238,003
July	142,995	96,018	239,013
August	143,717	96,634	240,351
September	144,297	97,284	241,581
October	144,582	97,553	242,135
November	144,972	97,956	242,928
December	144,256	98,033	242,289
1905.			
January	144,874	98,425	243,299
February	145,998	98,952	244,950
March	147,078	99,704	246,782
April	147,632	100,489	248,121

WEST AUSTRALIAN MINERAL PRODUCTION.

The Government Statist, Captain Jas. Wallace, has provided the *Journal* with the following table of returns of the Gold Production of Western Australia from 1st January, 1886, to 30th April, 1905:—

GOLD.

GOLD PRODUCTION OF WESTERN AUSTRALIA FROM 1ST JANUARY, 1886, TO 30TH APRIL, 1905.

Year.	Grand Total.					
	Export.	Mint.	Total.	Value.		
	Fine ozs.	Fine ozs.	Fine ozs.	£	s.	d.
1886 ...	270·17	...	270·17	1,147	12	2¼
1887 ...	4,359·37	...	4,359·37	18,517	8	6¼
1888 ...	3,124·82	...	3,124·82	13,273	7	10
1889 ...	13,859·52	...	13,859·52	58,871	9	11¾
1890 ...	20,402·42	...	20,402·42	86,663	19	5¼
1891 ...	27,116·14	...	17,116·14	115,182	0	10
1892 ...	53,271·65	...	53,271·65	226,283	11	8½
1893 ...	99,202·50	...	99,202·50	421,385	8	8½
1894 ...	185,298·73	...	185,298·73	787,098	19	6
1895 ...	207,110·20	...	207,110·20	879,748	4	2¼
1896 ...	251,618·69	...	251,618·69	1,068,808	5	2
1897 ...	603,846·44	...	603,846·44	2,564,976	12	9¼
1898 ...	939,489·49	...	939,489·49	3,990,697	13	10
1899 ...	1,283,360·25	187,244·41	1,470,604·66	6,246,731	10	7¾
1900 ...	894,387·27	519,923·59	1,414,310·86	6,007,610	13	4½
1901 ...	923,686·96	779,729·56	1,703,416·52	7,235,653	9	1
1902 ...	707,039·75	1,163,997·60	1,871,037·35	7,947,661	9	7¾
1903 ...	833,685·78	1,231,115·62	2,064,801·40	8,770,718	17	0¼
1904 ...	810,616·04	1,172,614·03	1,983,230·07	8,424,225	17	3¾
Total ...	7,861,746·19	5,054,624·81	12,916,371·00	54,865,256	11	9
1905† ...	241,987·09	410,551,96	652,539·05	2,771,809	13	11½
TOTAL...	8,103,733·28	5,465,176·77	13,568,910·05	57,637,066	5	8½

† 30th April.

MINERALS OTHER THAN GOLD.

Latest available Return (to 28th February, 1905) of Ore and Minerals, other than Gold, showing the Quantity produced and the Value thereof, as reported to the Mines Department from the respective Goldfields and Mineral Fields during 1904 and previous years.

Year.	Month.	Copper Ore.											
		Day Dawn D.		Mt. Malcolm D.		Northampton Mf.		Phillips River Gf.		West Pilbarra Gf.		Total.	
		Quantity	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		tons.	£	tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Previous to 1899 ...	...	...	...	...	...	...	...	...	...	7,018·00	55,270	7,018·00	55,270
1899 ...	...	...	...	273·00	4,338	136·00	2,122	...	...	2,555·00	29,478	2,964·00	35,938
1900 ...	..	5·15	91	4,539·00	30,718	...	...	34·00	725	1,605·00	12,139	6,183·15	43,673
1901 ...	...	10·50	76	7,660·00	40,738	38·50	277	1,089·14	12,918	1,162·00	15,891	9,960·14	69,900
1902 ...	...	...	...	1,954·00	6,852	...	...	308·25	1,238	...	...	2,262·25	8,090
1903 ...	...	...	...	18,965·00	45,557	...	...	1,561·33	10,984	...	...	20,526·33	56,541
1904 ...	...	...	...	500·00	900	...	...	3,468·89	24,280	...	...	3,968·89	25,180
	Total ...	15·65	167	33,891·00	129,103	174·50	2,399	6,461·61	50,145	12,340·00	112,778	52,882·76	294,592
1905 ...	January...	...	...	...	...	...	...	104·11	698	...	...	104·11	698
Do. ...	February	...	...	...	...	...	...	165·71	1,109	...	...	165·71	1,109
	TOTAL ...	15·65	167	33,891·00	129,103	174·50	2,399	6,731·43	51,952	12,340·00	112,778	53,152·58	296,399

MINERALS OTHER THAN GOLD—*continued.*

Year.	Month.	IRONSTONE.						LEAD ORE.		SILVER LEAD ORE.	
		West Pilbarra Gf.		State generally.		Total.		Northampton Mf.		Ashburton Gf.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		tons.	£	tons.	£	tons.	£	tons.	£	tons.	£
Previous to 1899 ...	...	100·00	300	...	...	100·00	300	...	...	...	...
1899 ...	...	...	...	12,852·00	8,939	12,852·00	8,939	82·75	912	...	...
1900 ...	...	...	...	12,251·00	9,258	12,251·00	9,258	268·00	533	...	...
1901 ...	...	...	...	20,569·00	13,246	20,569·00	13,246	...	...	21·05	152
1902 ...	...	...	...	4,800·00	2,040	4,800·00	2,040	...	...	35·85	277
1903 ...	...	...	...	220·00	88	220·00	88	...	...	...	...
1904 ...	...	...	...	1,441·50	577	1,441·50	577	...	...	...	...
	Total ...	100·00	300	52,133·50	34,148	52,233·50	34,448	350·75	1,445	56·90	429
1905 ...	January ...	...	...	...	...	...	...	...	...	...	...
Do. ...	February ...	...	...	...	...	...	...	...	...	...	...
	TOTAL ...	100·00	300	52,133·50	34·148	52,233·50	34,448	350·75	1,445	56·90	429

MINERALS OTHER THAN GOLD—*continued.*

Year.	Month.	COAL.		LIMESTONE.						DIAMONDS.	
		Collie River Coal Mf.		Yilgarn Gf.		State generally.		Total.		Nullagine D.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		tons.	£	tons.	£	tons.	£	tons.	£	carats.	£
Previous to 1899 ...	...	3,508·00	1,761	...	...	...	...	...	...	...	...
1899 ...	...	54,336·00	25,951	...	...	17,593·00	2,838	17,593·00	2,838	*	24
1900 ...	...	118,410·10	54,835	269·85	273	15,657·00	3,321	15,926·85	3,594	...	...
1901 ...	...	117,835·80	68,561	1,642·00	919	16,568·00	3,429	18,210·00	4,348	...	...
1902 ...	...	140,883·90	86,188	535·00	340	4,545·35	1,000	5,080·35	1,340	...	...
1903 ...	...	133,426·62	69,128	102·00	75	1,177·50	103	1,279·50	178	...	...
1904 ...	...	138,550·04	67,174	...	...	13,397·20	1,699	13,397·20	1,699	...	...
	Total ...	706,950·46	373,598	2,548·85	1,607	68,938·05	12,390	71,486·90	13,997	...	24
1905 ...	January ...	6,773·90	3,376	...	...	...	...	...	...	...	...
Do. ...	February ...	8,162·50	4,061	...	...	...	...	...	...	...	...
	TOTAL ...	721,886·86	381,035	2,548·85	1,607	68,938·05	12,390	71,486·90	13,997	...	24

NOTE.—As the collection of Statistics of Minerals other than Gold commenced during 1899, the total Production from the different localities can only be approximately estimated by the Customs Records, the latest available returns of which are to be found in Table XXI., pages 96-99 of the Annual Mining Statistics of the Department of Mines for the year 1903. * Weight unknown.

GARDEN NOTES FOR JUNE.

By PERCY G. WICKEN.

The beginning of the present month has brought in the regular winter rains, which we may now expect to continue. If the ground has been properly prepared, a large number of seedlings of all kinds of vegetables can be planted out immediately, and if good healthy plants are put out and well supplied with manure, they will make rapid growth. A few frosts will have probably occurred by this time; this will no doubt kill the few remaining beans left of the summer crops, but will not hurt the winter crops of cabbages, cauliflowers, and root crops. Cabbages and cauliflowers are very gross feeders, and to obtain good results require to be either planted on naturally rich soil, or to be kept growing by being well supplied with manures; these are best applied in a liquid form, and are then readily available for the plant to take up. Cabbages and cauliflowers thrive best on a nitrogenous manure, whereas turnips require superphosphate; peas superphosphate and potash. For a small garden, the manure is best suplied in small quantities and at frequent intervals. If the ground is likely to become wet, drains should be made to carry off the stagnant surface water.

ARTICHOKES (Globe) may be planted out at any time during the next few months. Either suckers from old plants or rooted plants may be used. If the soil is good, plant 3 feet apart each way, as they grow to a good size; if poor soil they may be planted closer.

ASPARAGUS.—If not already done, prepare a trench, as previously described, for spring planting.

BEANS (Broad) should now be growing well, and in some districts will be in bearing. A few more rows should be planted to keep up a succession.

CABBAGE.—Plant out all the strong healthy plants that you have, taking care that the roots are placed in the ground to the same depth as they were in the seed bed. Plant out a further supply of seed for future use.

CAULIFLOWERS.—Plant same as cabbages, but they require to be sown as early as possible.

CARROTS.—Thin out those already up; sow a few rows for future use.

CELERY.—Plant out in trenches all plants that are ready, and those already growing should be well earthed up so as to bleach them and make the stalks tender.

LEEKS.—Plant out any seedlings from the seed beds, and sow a further supply of seed. As soon as the plants reach six to eight inches in height they should be planted out in shallow trenches, first trimming off their roots and cutting back the leaves.

LETTUCE.—Plant out what seedlings you have. Sow a further supply of seed for future use.

ONIONS.—Plant out all young plants available, and sow a further supply of seed. In planting out in the beds do not plant too far apart; rows 12 to 15 inches apart, and from four to six inches in the rows, will be sufficient.

PEAS.—Pull up all old plants that have ceased bearing and plant out a fresh supply. There is always a good demand for this vegetable. All tall-growing varieties should be staked.

TURNIPS.—Those already up should be thinned out and kept free from weeds. A few more rows may be sown to keep up a supply.

FARM.—The present is one of the busy seasons of the year on a farm, although on a well-conducted farm in which everything does not depend on one crop, the busy season lasts all the year round. Seeding operations will be in full progress during this month, and in fact settlers who have fallow land to crop will have almost completed their sowing by this time; those not so fortunate will have to plough and sow as fast as they are able to do so, and can only get their crop in as fast as their means allow them. The fine weather experienced during April has been a great help in enabling settlers to get as much work done as possible before the rain sets in. Within a reasonable limit, the earlier-sown crops give the best results, and also effect a great saving of seed; starting, say, April 14, with about 40lbs. seed wheat to the acre, the quantity would have, at a rough estimate, to be increased about 5lbs. of seed for each week later in the season that it was sown, as the later-sown crops never stool out to such an extent as those sown earlier in the season. Pickling wheat to prevent smut is, I am afraid, much neglected, but all experiments carried out on this subject demonstrate that it pays to do so. The wheat can either be dipped in the bluestone solution as previously described, or, as is often done, the wheat spread out on the floor and thoroughly watered with the solution, the seed being continually turned over with a spade in the meantime. This method is somewhat less trouble, but is not so effective as the dipping the seed in a cask of solution. Another advantage of dipping the seed in the solution, a basket at a time, is that all the light weed seeds float to the surface and can be skimmed off, thereby saving the spread of weeds. Harrowing and rolling the crop after the seed drill has sown the seed should be always carried out, although the rolling will not hurt if done when the crop is six inches high, provided the ground is not too wet.

LOCAL MARKETS' REPORTS.

PATERSON & CO'S REPORT.

Messrs. Paterson & Co., Fremantle, report as follows in connection with their daily sales of produce, held at Perth and Fremantle, for the month, ending 9th May :—

Wheat.—London cables report the market at 31s. 3d. and 31s. 9d. per quarter c.i.f., and indicates an easier tendency. Eastern States quote at 3s. 3d. to 3s. 3½d. f.o.b. Adelaide, Melbourne, and Sydney. During the month wheat on Perth market has risen and declined 1d., the price now being the same as in our last monthly report, viz:—3s. 8d. per bushel for prime milling quality on rails Perth and Fremantle, the top price during the month being 3s. 9d. per bushel at these stations. The present price is equivalent to 3s. 4½d. per bushel on rails Northam.

Chaff.—Since we last reported the market has risen fully 10s. per ton for F.A.Q., the price now being £4 15s. per ton on rails Perth. Large quantities are being contracted at £4 5s. in the country, which is equivalent to the former price here. This rise is on a par with that which occurred last year about this time, and in all probability indicates the top of the market, at any rate for some time to come. We see nothing to justify expectations of a higher market, and would certainly advise farmers to take advantage of present prices. Supplies are coming forward fairly well for seeding time, and no doubt as soon as the bulk of the work is over, large quantities will be placed at these remunerative prices. There is always a tendency to over-estimate values on a rise such as has occurred lately, and the fact that the bulk of holders are satisfied with these prices, all tends to increase consignments, with a danger of glutting. Only in isolated cases has the price reached to £5 for very prime samples, and, taking the market right throughout for the month, £4 15s. is practically the ruling rate. Cow chaff has sold well recently, on account of the dryness of the weather, trucks realising up to £3 17s. 6d. per ton for weedy sorts, but otherwise sound. Since these late heavy rains, however, green feed should now be more plentiful, making the demand less. Oaten chaff has touched £4 15s. during the month for very prime samples, F.A.Q. realising £4 7s. 6d. to £4 10s. Stored chaff is being liberally disposed of at ruling rates, so that a shortage of supplies to the markets does not have the same effect which would prevail were no stocks held locally.

Straw.—Trussed straw of the best quality is worth from £2 to £2 2s. 6d. per ton on rails Perth, raked lots realising £1 15s., and in some cases as low as £1 12s. 6d. The demand for this should now come, since the wet weather has set in, and values should see a rise during the next month.

Pressed Wheaten Hay.—A fair inquiry is now on at nominally £3 5s. in the country for weedy lots, suitable for stock feed. Oaten Hay has not been in great demand during the month, very little coming forward.

Algerian Oats.—Melbourne advices announce a rise from 1s. 7d. to 1s. 8d. per bushel f.o.b. for stout, heavy feed, with a strong demand, principally owing to foreign inquiries. Locals have only been seen on the market to the extent of two trucks, which sold at the rate of 2s. 4½d. and 2s. 5½d. per bushel respectively. Seed Algerians have been in strong demand at remunerative prices.

Stout Feed Tasmanians have risen 3d. per bushel during the month, the quote now being 2s. 3d. f.o.b. Devonport, equivalent to 3s. 3d. on rails Perth, with a strong demand and a probability of higher rates.

New Zealand B Grades are still quoting at 1s. 9½d. to 1s. 10d. f.o.b., with a tendency in favour of sellers.

Bran.—Strong upward tendency, the market having risen nearly £1 per ton since last reporting. At present stocks in Fremantle and Perth are small and inquiries numerous. Local mills have raised their prices in proportion, and the probable closing down of certain mills will all tend to enhance values.

Pollard.—Pollard has dropped behind Bran in value, to-day's quotations being 7s. 6d. per ton below Bran prices, which, of course, are at a rather inflated value.

Barley.—Scarce, no consignments offering; demand limited.

H. J. WIGMORE & CO.'S REPORT.

Messrs. H. J. Wigmore & Co. report as follows in connection with their daily sales of produce, held at Perth and Fremantle for the month ended 10th May, 1905:—

Chaff.—Supplies during the month have continued much short of the demand, and the necessity, therefore, has arisen for produce merchants to draw on stored stocks. These will not last for ever, and at the rate they have been going out, it is very clear that either a distinct further rise must occur, or larger supplies must come from stocks held by farmers and speculators in the country. Our farmer friends will remember that from February on, we have predicted a considerable rise in chaff. This rise has now come, and we are convinced has come to stay. Temporary set-backs will, of course, occur. For instance, should 20 to 30 trucks arrive in Perth on consecutive days, say for a week, the market would probably ease, but this, we think, is not likely to occur, and even if so, the market would soon recover when shorter supplies came forward. In our last report to this *Journal*, we mentioned that prime green, well-cut wheaten chaff should realise £4 10s., and we also stated therein that a still firmer tendency would prevail. To day the value for prime green wheaten is £5 to £5 2s. 6d.; f.a.q., which in our last report was valued at £4 5s., we now quote at £4 17s. 6d. to £5; good medium wheaten £4 2s. 6d. in last report, now £4 10s. to £4 15s. So that farmers will realise the position, we subjoin a statement showing the values on the last two reports, as compared with the present:—

	10th. March.	10th. April.	10th. May.
Prime Green Wheaten	£4 0 0 ...	£4 10 0 ...	£5 0 0 to £5 2 6
F.A.Q.	3 15 0 ...	4 5 0 ...	4 17 6 to 5 0 0
Good Medium	3 10 0 ...	4 2 6 ...	4 10 0 to 4 15 0

Other qualities have risen correspondingly.

The future of the market is full of hope, and those farmers who have been fortunate enough to hold, have cause for congratulation. It must not be overlooked, however, that the great bulk of the chaff held in the country is now in the hands of speculators, who are waiting for still better prices. Northam value for prime is now £4 10s. on rails there. There is every prospect of a £5 10s. market during present season, but owing to cheap freights from the East and the low values prevailing there, we doubt very much if anything over £6 will be seen during the season. The difficulty in obtained authentic reports as to the quantity held in the country has also a deterrent effect on the market, as buyers naturally hesitate to commit themselves to forward buying, or even contracts of any magnitude, being fearful that supplies may come to Perth at any time in such volume as to seriously depress the market. The consumption of Perth and its suburbs would probably aggregate weekly between 300 and 350 tons, while Fremantle and its vicinity would probably consume something like a further 50 to 100 tons, and we may here say that Fremantle prices remain on about a par with Perth. The total number of trucks arriving in Perth during last week were 77, Fremantle about 10; making a total of, say, 90 trucks, which would average, say, four tons per truck, equal to 360 tons. This average is even greater than has prevailed for some time past, so that the steady withdrawal necessary from stocks held can be easily gauged. To sum up the position, we have no hesitation in saying that, in our opinion, speculators and farmers need have no apprehension in sending chaff forward to auction. We have made very heavy private sales during the month.

Algerian Oats.—During the month a few trucks of local heavies have come forward, and have been quitted at about 2s. 4½d. Supplies, however, have been largely drawn from Victoria. A rise f.o.b. has occurred, good feeds now being quoted at 1s. 7½d. to 1s. 8d., and prime heavies 1d. to 1½d. extra. On spot good heavy Victorian feeds are worth 2s. 4d. to 2s. 5d.

Seed Oats.—A heavy and seasonable demand has been experienced during the month, and we have sold very heavilly to farmers at prices ranging from 2s. 10d. to 2s. 11d., according to quality. We have still further supplies, and invite those requiring to correspond with us, when we shall be pleased to forward samples with prices.

Wheat is somewhat easier, and the Perth markets for prime milling rules at about 3s. 8d.; slightly smutty wheat at about 3s. 7½d. For milling purposes, of course, this is more than an equivalent, but it must be remembered that the bulk of the wheat brought to Perth and Fremantle is used for poultry feeding, and is therefore quite as valuable for that purpose as prime milling. Inferior and pinched samples, 3s. 7d. to 3s. 7½d.

Flour.—We record an easier market also for this commodity. We quote Thomas' Northam Standard £8s 7s. 6d on rails; Northam sacks: £8 12s. 6½d. for prompt delivery. For contracts the price is £8 10s. Adelaide is also easier, and for immediate shipment we quote £7 15s. f.o.b.

Bran and Pollard.—In these commodities a very excited market has ruled during the week, and the stocks held at Fremantle are now perhaps smaller than has been the case for years. A few weeks back both bran and pollard were very difficult to quit at £6 to £6 5s.; now £6 15s. to £7 can readily be obtained, and even at these prices it is difficult to purchase. Stocks will be replenished during next week, and already lower quotes are being freely made.

Bran Bags continue firm, and we are prepared to send quotes where required, as we hold heavy stocks.

Hay and Straw.—Very little business has been done during the month. One truck of the latter was passed in yesterday at 35s., but a private sale of it was effected immediately afterwards at £2. Keener demand for straw should now manifest itself.

HENRY WILLS & CO.'S REPORT.

WOOL, SKIN, AND HIDE.

Messrs. Henry Wills & Co. report under date, 11th May, as follows:—

Wool.—Prices in London, which were only fair in March, have improved during the sales which are now in progress to the extent of about 5 per cent. to 7½ per cent. for best merinos; 7½ per cent. to 10 per cent. for fine crossbreds; and 10 per cent. to 15 per cent. for coarse crossbreds, with a market at this advance at the time of writing. During the March series of wool sales, practically all wool, except the finest and loftiest merinos, sold for less money than in January; while inferior merinos, and most kinds of crossbreds, were considerably lower than before. This depreciation of value was reflected in the prices realised for West Australian wools. At the time of writing, the market seems to be very favourable, but, unfortunately, most West Australian wools from the farming districts are now sold.

Sheepskins.—In consequence of the very high prices which we have been paying, supplies direct to us have been much larger than usual at this time of the year. The news as to the progress of the present wool sales in London, has enabled us to advance paying prices, which are now considerably above the average of this season of the year. Best, clean, full-woolled merinos we are paying 7½d. to 7¾d. per lb. for; half to three-quarter-woolled merinos, 6½d. to 7d. per lb. Prices for fine crossbreds are about ¼d. to ½d. per lb. below merinos, but the course of the market would seem to indicate that they will shortly be on the same level. Above prices are for well dried, sound-pelted, clean-woolled skins, and skins which differ from these are worth less money according to degree. Damaged skins are worth from 1d. to 1½d per lb. less than sound.

Hides.—Prices for these have declined somewhat during the last two or three weeks, owing to prices in London not justifying export from the Eastern States, and the supplies there reflect on prices here. Light to medium weights show, by comparison, best values. We are paying to-day for sound clean hides, extra heavy, to 5¼d., medium 4¼d. to 4¾d., light 4½d. to 5d., damaged, cut and dried hides, prices acording to degree.

Kangaroos.—Prices for these are higher than they have been for some time. We have been paying up to 2s. 3d. all round, for sound 8s to 18s. other weights according to condition; but there has been a move in the market during the last few days, and we shall shortly be issuing a circular advising prices for all kangaroo skins.

Opossums.—Prices for these have for some time past been very poor on account of the war between Russia and Japan; but the London March sales established an advance of about 15 per cent. This was owing to the fact that there was at that time every prospect of the war coming to a speedy termination, and therefore the Russian buyers were ready to resume their purchases. Since the sales, however, peace prospects appear to be much more doubtful, and buyers are finding that they paid far too high a price for their skins. Unless the prospects of peace are better at time of next auctions (which take place in June), March values will not be maintained and a heavy drop may be looked for. In the meantime, we are paying prices on the basis of the March sales, and shall not reduce unless we hear that the contemplated fall has really taken place. Best blacks are worth to 17s. 6d. per dozen; best greys to 6s. 6d. per dozen; and best reds to 6s. per dozen.

Tallow.—We have resumed shipment to London, and are therefore, in a position to pay very high prices. Especially do we want farmers to send us all they can. This is a line which has been neglected by farmers in the past, but which might at the present prices, prove remunerative. It can be sent to us in kerosene tins. We are paying to 21s. per cwt., in sound-headed casks, and 18s. 6d. per cwt., in tins. Prices depend entirely on quality.

Horsehair, Beeswax, Horns, Cowhair we are buyers of, in any quantity, all the year round.

All the above quotations are net and free from all commission.

With regard to all the above goods we draw the special attention of growers, farmers, and hunters to the fact that prices depend to a great extent on the order, condition, and care which they give the various goods mentioned. Full information with regard to these may be obtained from our Blue Card which is supplied free, as also are our labels and post-cards.

DALGETY'S WEEKLY REPORT.

Messrs. Dalgety & Co. report as follows in connection with their daily sales of produce held at Perth and Fremantle for the week ending 5th May :—

Wheat.—Sales of wheat (Australian) are reported from London at 31s. 3d. per quarter of 480lb., c.i.f. Melbourne and Adelaide markets are steady at 3s. 3d. to 3s. 4d. per bushel, which looks like "bedrock."

Local Wheat.—Very few parcels are now changing hands. Country values are nominally 3s. 3d. to 3s. 4d. per bushel, f.o.r. Just at the moment the demand for wheat is limited, and at the same time offerings are inconsiderable. We have an inquiry for wheat at the above prices, and would like to hear from holders. A reduction of 5s. to 7s. 6d. per ton is announced in the prices of flour. Perth and Fremantle wheat markets have weakened by ½d. to 1d. per bushel, prime milling selling at 3s. 8½d. per bushel, smutty from 3s. 7d. per bushel.

Chaff.—Supplies to Perth and Fremantle continue light, and although no alteration in prices can be reported the demand is firm, all lots offered at auction being eagerly competed for. Ruling prices are :—Prime green wheaten, from £4 15s. to £4 17s. 6d. per ton (whilst an extra sample is worth £5 per ton) ; fair average quality wheaten, from £4 10s. to £4 12s. 6d. per ton ; sound wheaten, lacking colour, from £4 per ton ; cow chaff in better demand, at from £3 10s. per ton to £3 15s. ; prime oaten up to £5 per ton ; good sound oaten, £4 10s. to £4 15s. per ton. We sold 40 tons of chaff *ex* our Fremantle store at £4 17s. 6d. to £5 2s. 6d., and 15 tons *ex* our Perth store at £5 per ton. There is still an active demand in the country, and holders are daily becoming less inclined to sell unless at higher prices. Northam market is firm at £4 10s. per ton. We anticipate light supplies of chaff to come forward for some time, which should insure a good market, and although the outlook is good, farmers who can cart might do well to sell at least a portion of their holdings during the next few months. A comparison of various quotations will show that prices now obtaining are much better than those offering privately in the country. With regard to chaff in our various stores, we have commenced to sell, and will now continue to dispose of such quantities as will, in our opinion, not affect prices. It will take some little time to effect a clearance, and account sales and cheque for proceeds will be promptly mailed as each truck is sold. Supplies at the present time are being drawn from York, Northam, Meckering, and Midland districts, but south of Beverley stocks are very light.

Algerian Oats.—Our Melbourne office wires a better market at from 1s. 7½d. to 1s. 8d. per bushel, f.o.b. Heavy sales of Algerians are reported to have recently been made at Fremantle at from 2s. 4½d. to 2s. 7d. per bushel, free on rails Fremantle, whole and crushed, the local market being firm and stocks light.

White Oats.—Devonport quotes Tasmanian whole at 2s. 3d. per bushel, f.o.b. Devonport. Several parcels have changed hands in Fremantle, and this market is firm at from 3s. 1½d. to 3s. 2½d. per bushel, whole and crushed.

Hay.—During the week we sold 80 tons of machine-pressed hay for stock at £3 15s. 6d. per ton, free on rails Fremantle. We have still other inquiries.

Straw is quiet at £2 to £2 2s. 6d. per ton at Perth and Fremantle.

Bran is firm, with a tendency to rise. Sydney quotes 9½d. per bushel, and sales are to-day reported from the country at £6 10s. per ton. Supplies at Fremantle are very light.

KALGOORLIE CHAFF REPORT.

We have to advise that supplies to Kalgoorlie still continue very light, the daily arrivals being insufficient for requirements, and, consequently, the demand is very keen indeed. Since last report prices have firmed considerably. Thursday's values are as follows:—Prime wheaten, £5 17s. 6d. to £6, probably an additional 5s. for extra green samples; good qualities, up to £5 10s., medium, £5 5s. Market is firm, and all offerings meet with a ready sale, the demand being exceptionally keen for good to prime qualities.

FREMANTLE STOCK SALES.

Messrs. Dalgety and Co., Ltd., held a sale of fat sheep on Monday last, when there was a large and representative attendance of buyers, but, as the market was over-supplied, bidding lacked animation; however, the following sales were effected:—4,284 fat wethers, good fleeces, at 5¼d. per lb.; 340 cull wethers, at 5⅛d. per lb.; 840 ewes, sold privately, at 16s. 6d. per head.

HIDES, SKINS, TALLOW, ETC.

Messrs. Dalgety & Co., Ltd., report having held their usual weekly sale on Friday, May 5:—

Sheepskins.—Average supplies to hand, and mostly of inferior description. Competition was not so strong as usual, and the late high values were maintained with difficulty. Good merino ¾ to full wool, 7d. to 7¼d.; medium ¾ to full wool, 6¾d. to 6⅞d.; good merino ½ to ¾ wool, 6¾d. to 7d.; medium ½ to ¾ wool, 6¼d. to 6½d.; good merino ¼ to ½ wool, 6¼d., to 6½d.; medium merino ¼ to ½ wool, 5¾d. to 6¼d.; fine crossbred ½ to ¾ wool, 6½d. to 7d.; coarse crossbred ½ to ¾ wool, 6d. to 6¼d.; pelts, merino and crossbreds, 5d. to 5¾d.; pelts, shearlings, 4¼d. to 5d.; lamb pelts, 5d. to 5½d. In all cases where pelts of above are sun-dried, weevil-eaten, torn, or perished, prices are from 1d. to 2d. below quotations.

Hides.—There is a general tone of weakness in this market, and withdrawals were frequent, dirty, wet, and bad-conditioned lines being most affected. Heavies, extra, none forward; heavies, to 5d.; medium and light, 4¾d. to 4⅞d.; medium and light, dirty condition, 4¼d. to 4¾d.; dry, 4½d. to 5¼d; damaged and cut, 3¾d. to 4¼d.

Kangaroo Skins.—All descriptions were eagerly competed for on the lower basis of values ruling last week, and we effected a ready clearance of all offerings at prices which should be satisfactory to owners. ¾lb. to 1¼lb. average, blue skins, 2s. 5d. to 2s. 6½d.; red skins, 2s. 5d. to 2s. 7d. (nominal). ¾lb. to 1½lb. average, blue, 2s. 2d. to 2s. 3d; red, 2s. 2d. to 2s. 4d. 1¾lb. to 2lb. average, blue, 1s. 11d. to 2s.; red, 1s. 10d. to 2s. 1d. Extra heavy and very light weights, blue, 1s. 3d. to 1s. 8d.; red, 1s. 3d. to 1s. 10d. Damaged lines, blue, 1s. 6d. to 2s.; red, 1s. to 1s. 8d. Euro skins, red, 1s. 6d. to 1s. 10d. Brush kangaroo, to 1s. 5d.

Opossum Skins.—A small offering, and values received show no alterations from those lately quoted. Good greys, to 6s. 6d. per dozen average; fair greys, 6s. per dozen average; blacks, 16s. to 16s. 6d. per dozen average.

Tallow.—We sold a very superior line at improved prices; other descriptions are unchanged. Super mixed (in casks), to 21s. 3d. per cwt.; good mixed (in casks), to 20s. 6d. per cwt.; inferior and medium mixed (in casks) 17s. to 19s. per cwt.; tins and oddments, 16s. to 19s. per cwt.

Horns, Hair, etc.—In the absence of supplies we quote these lines nominally.

THE CLIMATE OF WESTERN AUSTRALIA DURING APRIL, 1905.

The month has been free from any meteorological event of note. Several disturbances passed eastwards along our coast, but as a rule too far away to affect this State, except on the south coast line, where the rainfall was considerably heavier than usual. Only a few light, scattered showers were recorded in the tropics, and over the goldfields the rainfall was rather below the average, but in western districts from Geraldton to the Leeuwin about an average fall was recorded. The pressure was above normal from Geraldton and the Murchison northwards, and about normal elsewhere. An average temperature was experienced over the Coolgardie Goldfields and along the south coast, but slightly above the average, both in the daytime and at night, over the rest of the State.

The following table gives the mean and lowest readings of a thermometer placed on the surface of the ground at various stations:—

Station.	Mean.	Lowest.	Date.
Peak Hill	58·0	46·0	24, 28
Cue	57·2	43·0	6
Coolgardie	49·0	34·2	24
Southern Cross	48·6	30·0	25
Walebing	47·8	36·0	6, 8
York	48·0	32·0	24
Perth Observatory	52·5	39·2	22
Wandering	47·9	34·0	18, 25
Narrogin	44·0	33·0	23
Katanning	47·7	28·0	23
Mt. Barker	45·5	32·0	22
Bridgetown	44·6	26·0	24
Karridale	46·0	33·0	24

The Climate of Western Australia during April, 1905.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						April, 1905.					* Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
NORTH-WEST AND NORTH COAST:	Wyndham	29·926	29·907	30·105	29·780	97·4	79·6	88·5	101·0	73·0	95·0	77·3	103·2	63·5	38	2	1080
	Derby	29·942	29·917	30·096	29·797	97·5	73·4	85·4	103·0	62·0	95·7	70·9	103·2	55·0	*Nil*	...	1299
	Broome	29·940	29·924	30·122	29·807	95·2	75·2	85·2	101·8	64·8	93·8	71·6	102·4	56·0	*Nil*	...	372
	Condon	29·952	29·945	30·165	29·782	93·4	69·4	81·4	102·0	62·1	90·1	66·3	103·0	46·0	28	1	245
	Cossack	29·969	29·954	30·179	29·763	95·7	72·8	84·2	106·0	61·0	91·2	70·2	105·0	59·7	*Nil*	...	234
	Onslow	29·970	29·950	30·146	29·836	93·1	67·8	80·4	106·0	57·0	92·0	67·5	105·0	53·0	*Nil*	...	243
	Winning Pool	...	...	...	...	...	...	...	...	...	...	...	...	...	*Nil*	...	450
	Carnarvon	30·017	29·992	30·203	29·870	84·7	65·3	75·0	95·3	54·3	82·9	64·0	108·0	46·0	13	2	298
	Hamelin Pool	30·020	30·004	30·230	29·820	87·0	62·0	74·5	93·0	54·0	85·6	61·6	105·6	50·0	17	3	160
	Geraldton	30·082	30·052	30·303	29·845	80·4	60·8	70·6	102·5	51·5	78·1	59·3	99·4	41·8	49	5	111
INLAND:	Hall's Creek	29·998	29·968	30·212	29·826	99·9	65·1	82·5	101·5	52·9	91·5	63·3	102·0	47·0	41	3	479
	Marble Bar	...	...	...	...	99·3	73·3	86·3	107·0	59·0	96·4	68·0	106·0	50·0	*Nil*	...	551
	Nullagine	29·976	29·950	30·249	29·708	93·7	67·6	80·6	101·5	56·0	90·1	61·7	99·8	41·0	10	1	219
	Peak Hill	30·015	29·986	30·330	29·800	86·0	62·0	74·0	96·0	49·0	83·5	61·5	95·8	48·8	50	2	222
	Wiluna *	30·025	30·003	30·373	29·756	84·6	58·3	71·4	99·0	42·2	84·9	56·2	99·4	39·5	55	4	243
	Cue	30·057	30·034	30·379	29·771	86·6	61·6	74·1	96·2	48·0	84·5	59·8	101·0	41·0	6	1	158
	Murgoo	...	...	...	...	86·1	60·2	73·2	97·0	45·0	...	...	...	...	41	2	62
	Yalgoo	30·057	30·038	30·242	29·808	84·1	59·9	72·0	95·6	47·4	83·4	58·1	102·5	42·3	44	3	357
	Lawlers	30·070	30·050	30·433	29·765	82·2	59·3	70·8	94·1	48·2	81·0	58·0	98·1	39·4	174	6	252
	Laverton	30·087	30·069	30·491	29·733	80·2	56·9	68·6	95·6	43·5	82·0	56·4	96·9	38·6	43	3	128
	Menzies	30·086	30·077	30·454	29·797	79·6	56·7	68·2	93·2	46·8	78·4	56·0	98·0	37·0	79	5	102
	Kanowna	...	...	...	...	78·2	52·8	65·5	92·0	41·0	...	...	...	...	46	4	163
	Kalgoorlie	30·103	30·098	30·484	29·761	78·1	55·3	66·7	92·3	43·9	77·3	54·7	96·2	38·8	43	3	158
	Coolgardie	30·078	30·092	30·483	29·738	76·9	53·6	65·2	92·4	42·2	77·1	53·8	97·8	38·1	67	5	190
	Southern Cross	30·062	30·072	30·453	29·741	80·9	51·8	66·4	92·8	36·0	78·3	51·4	98·0	31·7	27	2	124
	Kellerberrin	...	...	...	...	...	...	...	...	...	...	...	...	...	69	4	87
	Walebing *	...	...	...	...	79·9	53·7	66·8	91·0	41·0	79·0	51·9	95·7	37·4	67	5	114
	Northam *	...	...	...	...	79·3	52·7	66·0	90·0	39·0	79·2	51·0	92·6	37·4	105	6	137
	York	30·088	30·096	30·391	29·727	78·2	50·6	64·4	89·6	38·0	78·0	51·2	100·2	34·5	129	7	145
	Guildford	...	...	...	...	79·0	54·6	66·8	92·4	41·4	79·2	53·4	96·4	36·5	143	5	184

* Averages for three years only.

The Climate of Western Australia during April, 1905—*continued*.

Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
					April, 1905.					* Average for previous Years.						
	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:																
Perth Gardens ...	30·087	30·106	30·384	29·736	76·5	56·8	66·6	87·6	46·0	77·1	54·8	99·0	41·0	157	5	201
Perth Observatory	30·104	30·097	30·419	29·735	76·3	56·8	66·6	89·2	46·0	75·0	56·4	97·4	42·4	164	5	211
Fremantle ...	30·109	30·092	30·420	29·738	74·1	59·9	67·0	88·5	51·8	73·2	58·4	93·6	46·4	76	4	105
Rottnest ...	30·106	30·069	30·393	29·761	72·7	61·4	67·0	84·0	49·0	72·0	60·1	91·0	47·8	117	4	138
Mandurah* ...	...	...	...	...	75·3	52·9	64·2	87·3	38·3	75·4	52·2	93·4	36·8	184	4	238
Marradong ...	...	...	...	...	...	...	...	...	...	...	...	...	...	127	4	172
Wandering ...	...	...	...	...	77·6	46·8	62·2	90·4	36·0	...	...	...	...	125	4	150
Narrogin ...	...	...	...	...	73·4	48·3	60·8	84·0	37·0	...	...	...	...	190	7	223
Collie	...	...	...	...	75·4	47·3	60·8	86·0	29·7	72·9	43·9	89·1	29·6	134	6	217
Donnybrook* ...	...	...	...	...	75·3	50·8	61·4	85·3	34·3	73·5	48·4	86·7	33·4	181	7	210
Bunbury ...	30·126	30·106	30·417	29·715	73·0	54·0	63·5	85·5	39·0	73·0	52·7	89·5	36·7	121	9	212
Busselton* ...	...	...	...	...	73·2	51·3	62·2	81·0	36·0	71·8	49·7	87·3	32·3	73	6	120
Cape Naturaliste	30·106	...	30·408	29·682	69·6	57·3	63·4	77·5	48·8	...	...	...	...	137	4	195
Bridgetown* ...	...	...	...	...	74·4	47·6	61·0	88·9	29·5	72·6	44·3	90·0	29·5	185	9	245
Karridale ...	30·096	30·110	30·401	29·664	71·0	51·8	61·4	82·0	38·0	70·4	51·9	92·0	36·6	294	14	410
Cape Leeuwin ...	30·088	30·070	30·388	29·644	70·9	60·1	65·5	83·0	53·4	68·9	58·8	89·5	49·0	234	13	326
Katanning ...	30·088	30·098	30·414	29·710	74·3	51·7	63·0	87·0	38·0	72·0	48·4	96·2	33·0	161	7	196
Mt. Barker ...	...	...	...	...	69·2	48·6	58·9	86·5	39·5	...	...	...	...	545	13	668
Albany	30·107	30·100	30·437	29·636	70·1	52·0	61·0	81·0	41·2	68·7	52·6	98·5	39·5	327	15	543
Breaksea... ...	30·088	30·102	30·452	29·702	66·4	56·5	61·4	80·0	49·8	66·3	56·0	96·4	44·0	386	19	565
Esperance ...	...	30·116	30·427	29·739	72·2	54·0	63·1	90·0	42·0	72·3	54·3	99·0	40·2	464	12	986
Balladonia ...	30·142	...	30·561	29·668	74·2	50·3	62·2	87·8	37·0	...	...	...	...	57	7	208
Eyre	30·098	30·110	30·608	29·758	74·6	53·4	64·0	90·0	37·4	73·6	55·3	100·7	36·8	46	7	144
INTERSTATE.																
Perth	30·101	30·097	30·419	29·735	76·3	56·3	66·6	89·2	46·0	75·0	56·4	97·4	42·4	164	5	211
Adelaide	30·156	30·146	30·450	29·804	73·4	54·7	64·0	91·7	47·0	73·4	54·7	98·0	39·6	366	11	557
Melbourne	30·179	30·025	30·469	29·737	69·6	52·4	61·0	88·4	38·8	68·6	50·6	94·0	34·8	302	8	1,928
Sydney	30·220	30·103	30·390	29·820	73·0	60·9	68·5	80·0	51·0	70·8	58·2	88·9	44·6	587	7	1,845

* Averages for three years only.

The Observatory, Perth, 9th May, 1905.

W. E. COOKE, Government Astronomer.

RAINFALL for March, 1905 (completed as far as possible), and for April, 1905 (principally from Telegraphic Reports).

STATIONS.	MARCH.		APRIL.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham ...	117	8	38	2
6-Mile	383	6	...	...
The Stud Station	...	...	...	...
Carlton	359	8	...	...
Rosewood Downs	...	...	...	...
Argyle Downs ...	273	6	...	...
Lisadell	..	...	...	...
Turkey Creek ...	719	3	42	2
Ord River ...	284	6	...	...
Alice Downs ...	79	3	...	...
Hall's Creek ...	35	3	41	3
Nicholson Plains	...	...	...	...
Flora Valley ...	...	...	...	...
Ruby Plains ...	...	...	...	...
Denison Downs...	...	...	...	...
WEST KIMBERLEY:				
Obagama ...	149	4	..	...
Beagle Bay ...	511	8	...	...
Pt. Torment ...	385	5	...	...
Derby	48	3	Nil	...
Yeeda	55	3	...	...
Liveringa ...	80	1	...	...
Leopold Downs...	...	...	...	...
Fitzroy Crossing	72	6	79	2
Fitzroy (C. Blythe)	16	2	...	...
Quanbun ...	Nil	...	...	...
Nookanbah ...	...	...	...	...
Broome	Nil	...	Nil	...
Roebuck Downs	48	2	...	...
Thangoo	...	...	...	...
La Grange Bay...	6	2	2	1

STATIONS.	MARCH.		APRIL.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST:				
Wallal	10	1	20	1
Condon	99	2	28	1
Pardoo	...	...	...	...
DeGrey River ...	...	...	...	...
Port Hedland ...	Nil	...	9	2
Boodarie ...	6	1	...	...
Warralong ...	...	...	...	...
Muccan	40	2	...	...
Ettrick	70	3	...	...
Mulgie	25	2	...	..
Eel Creek ...	...	...	...	...
Station Peake ...	278	8	...	...
Coongon	28	2	...	...
Warrawagine ...	50	1	...	...
Bamboo Creek ...	16	3	26	2
Marble Bar ...	104	4	Nil	...
Warrawoona ...	46	3	3	..
Corunna Downs...	...	...	...	...
Nullagine ...	69	3	10	1
Mt. Edgar ...	28	3	...	...
Kerdiadary ...	165	3	...	...
Roy Hill... ...	...	...	...	...
Middle Creek ...	69	3	...	...
Mosquito Creek	60	1	...	...
Mulga Downs ...	260	5	...	...
Woodstock ...	218	2	Nil	...
Mt. Florence ...	...	...	...	...
Tambrey ...	108	5	...	...
Millstream ...	136	4	...	...
Yandyarra ...	...	...	...	...
Mallina	191	7	...	...
Whim Creek ...	135	5	Nil	...
Cooyapooya ...	49	2	Nil	...
Woodbrooke ...	13	2	...	...

RAINFALL—*continued.*

STATIONS.	MARCH.		APRIL.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST—*cont.*				
Croydon	...	...	...	...
Balla Balla	...	...	...	...
Roebourne	Nil	...	Nil	...
Cossack	Nil	...	Nil	...
Sherlock	145	2	Nil	...
Fortescue	Nil	...	Nil	...
Mardie	Nil	...	...	...
Mt. Stewart	...	...	...	...
Yarraloola	Nil	...	...	...
Chinginarra	Nil	...	...	...
Onslow	9	2	Nil	...
Peedamullah	146	3	42	1
Red Hill	Nil	...	...	...
Mt. Mortimer	13	1	..	...
Peake Station	...	...	...	...
Wogoola	5	1	...	...
Nanutarra	97	2	...	...
Yanrey	...	...	...	...
Point Cloates	Nil	...	...	...
GASCOYNE:				
Winning Pool	271	2	Nil	...
Coordalia	...	...	...	...
Towara	7	3	...	...
Ullawarra	Nil	...	...	...
Maroonah	...	...	...	...
Gifford Creek	Nil	...	...	...
Bangemall	Nil	...	...	...
Mt. Augustus	...	...	...	...
Minnie Creek	7	2	...	...
Yanyeareddy	...	...	...	...
Williambury	Nil	...	...	...
Booloogooroo	...	...	...	...
Wandagee	...	...	...	...
Bernier Island	...	...	...	...
Boolathana	13	1	2	1
Carnarvon	6	1	13	2
Brick House	7	2	...	...
Doorawarrah	30	2	...	...
Bintholya	Nil	...	...	...
Mungarra	8	1	...	...
Clifton Downs	8	4	...	...
Dairy Creek	Nil	...	...	...
Upper Clifton Downs	...	...	...	...
GASCOYNE—*contd.*				
Dirk Hartog Island	1	...	...	...
Sharks Bay	Nil	...	37	1
Kararang	Nil	...	...	...
Meedo	Nil	...	...	...
Tamala	...	...	...	...
Wooramel	2	1	27	4
Hamelin Pool	10	1	17	3
Byro	18	1	37	2
Yarra Yarra	16	1	Nil	...
Berringarra	Nil	...	18	2
Mt. Gould	Nil	...	...	...
Moorarie	13	2	...	...
Wandah	Nil	...	Nil	...
Peak Hill	3	1	50	2
Mt. Fraser	7	1	...	...
Abbotts	Nil	...	Nil	...
Belele	...	...	...	...
Mileura	8	1	...	...
Milly Milly	Nil	...	22	2
Manfred	17	1	17	3
New Forest	12	1	24	2
Woogorong	Nil	...	...	...
Boolardy	25	1	...	...
Twin Peaks	Nil	...	...	...
Billabalong	Nil	...	...	...
Wooleane	46	2	10	1
Woolgorong	28	4	...	...
Murgoo	Nil	...	41	2
Yallalonga	23	7	4	1
Meka	Nil	...	98	1
Mt. Wittenoom	Nil	...	46	2
Nannine	9	1	7	1
Star of the East	8	1	Nil	...
Annean	...	...	...	...
Coodardy	Nil	...	Nil	...
Cue	2	1	6	1
Day Dawn	Nil	...	12	1
Lake Austin	Nil	...	101	1
Lennonville	10	1	56	2
Mt. Magnet	10	1	46	3
Challa	10	1	21	2
Youeragabbie	Nil	..	...	...
Black Range	Nil	...	...	...
Murrum	Nil	...	25	2
Burnerbinmah	54	3	90	5
Barnong	17	2	39	3

RAINFALL—*continued.*

STATIONS.	MARCH.		APRIL.		STATIONS.	MARCH.		APRIL.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.		No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*					SOUTH-WESTERN DIVISION, CENTRAL (COASTAL):				
Mellenbye	7	1	70	4					
Yalgoo	34	3	44	3					
Wagga Wagga	49	2	...	...					
Gabyon	22	1	28	1	Gingin	1	1	126	5
Tallyrang	27	1	...	...	Belvoir	14	2	173	4
Gullewa	11	1	20	3	Wandu	30	6	219	9
Muralgarra	36	1	57	2	Guildford	25	4	143	5
Wydgee	116	3	87	3	Kalbyamba	6	3	155	4
					Canning W't'r'w'ks	...	...	211	4
					Perth Gardens	29	4	157	5
SOUTH-WEST DIVISION (NORTHERN PART):					Perth Observatory	29	5	164	5
					Subiaco	24	3	152	4
					Jandakot	...	...	126	4
					Fremantle	12	3	76	4
Murchison House	35	1	54	4	Rottnest	9	4	117	4
Mt. View	30	1	...	...	Rockingham	15	1	144	4
Mumby	15	2	39	5	Jarrahdale	14	2	198	6
Yuin	20	1	Nil	...	Serpentine	6	2	160	6
Northampton	3	1	53	5	Mandurah	10	1	184	4
Narra Tarra	14	1	...	...	Pinjarra	16	2	178	3
Tibradden	13	1	62	6	Yarloop	21	4	81	4
Myaree	7	1	94	4	Harvey	14	2	85	5
Sand Springs	20	1	43	3	Upper Murray	31	3	184	5
Mullewa	2	1	18	5					
Kockatea	5	1	16	4					
Geraldton	16	3	49	5					
Greenough	10	1	93	3	SOUTH-WEST, CENTRAL PART (INLAND):				
Bokara	6	1	105	4					
Dongara	5	1	55	4					
Brookman's Hills	17	1	53	3					
Strawberry	17	1	40	3	Hatherley	Nil	...	...	...
Nangetty	...	...	...	...	Dowerin	Nil	...	59	3
Mingenew	17	1	57	4	Momberkine	6	1	64	3
Urella	22	1	28	1	Monglin	...	...	...	...
Yandenooka	...	...	...	...	Newcastle	Nil	...	72	5
Rothesay	55	4	...	...	Eumalga	5	3	115	5
Condingnow	42	3	...	...	Northam	9	2	105	6
Field's Find	57	3	37	5	Grass Valley	2	1	101	4
Carnamah	Nil	...	56	5	Meckering	4	1	69	4
Watheroo	Nil	...	51	3	Cunderdin	3	1	106	4
Dandaragan	Nil	...	115	5	Codg-Codgin	Nil	...	...	...
Moora	Nil	...	54	4	Yarragin	10	2	...	...
Yatheroo	...	...	...	...	Doongin	9	1	78	3
Walebing	1	1	67	5	Cutenning	15	2	133	6
Round Hill	Nil	...	...	...	Whitehaven	Nil	...	131	5
New Norcia	Nil	...	104	4	Sunset Hills	3	1	116	5
Wannamel	21	2	182	5	Cobham	5	1	132	5

RAINFALL—*continued.*

STATIONS.	MARCH.		APRIL.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST, CENTRAL—*contd.*				
Yenelin	Nil	...	97	5
Mt. Caroline ...	14	1	69	3
York	4	2	129	7
Dalebridge ...	5	1	165	6
Beverley ...	Nil	...	201	5
Bally Bally ...	Nil	...	177	7
Barrington ...	Nil	...	166	3
Qualin	9	2	164	4
Stock Hill ...	Nil	...	166	5
Sunning Hill ...	21	4	172	7
Brookton ...	51	4	125	4
Wandering ...	4	1	125	4
Glen Ern ...	17	4	193	7
Pingelly ...	7	1	188	5
Yornan	27	2	198	7
Marradong ...	Nil	...	127	4
Bannister ...	4	1	...	...
Wounaminta ...	10	1	150	7
Narrogin ...	11	4	171	7
Narrogin State Farm	11	1	190	7
Wickepin ...	7	1	218	5
Gillimaning ...	16	2	146	5
Bunking ...	Nil	...	119	3
Bullock Hills ...	Nil	...	140	6
SOUTH-WEST DIVISION (SOUTHERN PART):				
Bunbury ...	11	4	121	9
Brunswick ...	18	2	147	3
Collie	6	1	134	6
Glen Mervyn ...	11	2	335	7
Donnybrook ...	Nil	...	181	7
Boyanup ...	7	1	164	5
Ferndale ...	10	2	203	6
Busselton ...	6	4	73	6
Quindalup ...	5	1	80	4
Cape Naturaliste	16	3	137	4
Lower Blackwood	25	2	202	4
Karridale ...	33	5	394	14
Cape Leeuwin ...	26	7	234	13
Biddellia ...	74	4	...	...
The Warren ...	140	6	244	8
SOUTH-WEST—*continued.*				
Lake Muir ...	47	3	304	12
The Peninsula ...	23	5	163	11
Mordalup ...	50	5	252	10
Deeside	62	6	293	11
Riverside ...	55	5	200	9
Balbarup ...	44	3	275	5
Wilgarup ...	47	5	219	10
Bridgetown ...	22	4	185	10
Westbourne ...	13	4	295	10
Hilton	14	4	209	7
Greenbushes ...	14	2	260	7
Greenfields ...	8	2	358	6
Glenorchy ...	Nil	...	185	5
Williams ...	Nil	...	113	6
Arthur	Nil	...	150	4
Darkan	Nil	...	...	...
Wagin	3	1	166	5
Glencove ...	13	2	162	8
Dyliabing ...	5	1	147	9
Katanning ...	11	1	161	7
Kojonup ...	22	4	337	7
Broomehill ...	10	1	209	10
Sunnyside ...	17	3	215	10
Talbot House ...	12	1	140	6
Woodyarrup ...	21	5	194	9
Mianelup ...	10	3	231	11
Cranbrook ...	22	4	255	7
Toolbrunup ...	7	2	303	10
Tambellup ...	11	3	412	11
Woogenellup ...	20	3	249	9
Mt. Barker ...	50	7	545	13
Kendenup ...	27	4	480	10
St. Werburgh's...	52	5	532	11
Forest Hill ...	68	6	532	13
Denmark ...	138	5	400	11
Grasmere ...	128	7	342	13
Albany	112	7	327	15
King River ...	100	4	504	8
Point King ...	123	6	326	13
Breaksea ...	93	10	386	19
Cape Riche ...	70	4	...	...
Cherilallup ...	6	1	150	7
Bremer Bay ...	34	5	581	9
Peppermint Grove	54	7	664	14
Jarramongup ...	36	7	190	13

RAINFALL—*continued.*

STATIONS.	MARCH.		APRIL.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN DIVISION:				
Dural	9	1	37	3
Wiluna	11	1	55	4
Gum Creek	...	...	47	1
Mt. Sir Samuel	Nil	...	60	4
Lawlers	2	2	174	6
Leinster G.M.	Nil	...	...	...
Darda	21	2	49	5
Duketon	19	1	55	4
Mt. Leonora	Nil	...	31	3
Mt. Malcolm	Nil	...	13	1
Mt. Morgans	Nil	...	12	1
Laverton	1	1	43	3
Murrin Murrin	Nil	...	5	1
Yundamindera	Nil	...	12	1
Tampa	Nil	...	23	1
Kookynie	1	1	60	6
Niagara	1	1	46	5
Yerilla	Nil	...	49	4
Quandinnie	Nil	...	...	...
Edjudina	Nil	...	...	...
Menzies	8	1	79	5
Mulline	14	4	25	7
Waverley	30	4	60	6
Goongarrie	6	2	19	5
Mulwarrie	10	1	51	4
Bardoc	13	2	42	3
Broad Arrow	30	2	39	4
Kurnalpi	9	2	29	4
Bulong	10	1	18	3
Kanowna	53	2	46	4
Kalgoorlie	17	2	43	3
Coolgardie	7	2	67	5
Burbanks	51	4	...	...
Woolubar	2	1	72	4
Widgiemooltha	49	4	82	7
50-Mile Tank	Nil	...	65	5
Waterdale	16	3	90	7
Norseman	Nil	...	111	7
Lake View	Nil	...	168	7
Bulla Bulling	40	3	53	3
Boondi	8	2	38	6
Boorabbin	Nil	...	60	5
EASTERN—*contd.*				
Koorarawalyee	5	1	42	4
Karalee	5	1	62	3
Yellowdine	Nil	...	81	4
Southern Cross	Nil	...	27	2
Parker's Range	5	2	31	8
Parker's Road	3	1	26	1
Mt. Jackson	15	2	24	2
Bodallin	Nil	...	60	2
Burracoppin	3	1	39	2
Kellerberrin	4	1	69	4
Merriden	Nil	...	32	3
Nangeenan	Nil	...	40	2
Mangowine	5	1	62	2
Wattoning	Nil	...	Nil	...
Noongarin	...	...	30	1
EUCLA DIVISION:				
Ravensthorpe	8	4	277	14
Coconarup	4	3	202	11
Hopetoun	8	1	434	8
Fanny's Cove	103	4	...	...
Park Farm	47	4	290	11
Esperance	144	5	464	12
Gibson's Soak	47	7	343	10
30-Mile Condenser	45	4	303	11
Swan Lagoon	23	3	494	11
Grass Patch	...	...	...	...
Myrup	80	6	450	12
Lynburn	228	8	...	...
Boyatup	79	6	...	...
Middle Island	49	4	...	...
Point Malcolm	22	3	...	...
Israelite Bay	12	4	220	12
Balbinia	46	6	...	...
Frazer Range	Nil	...	...	...
Balladonia	11	3	57	7
Southern Hills	Nil	...	...	...
Eyre	20	5	46	7
Mundrabillia	110	3	...	...
Eucla	21	1	78	7

The Observatory, Perth,
9th May, 1905.

W. E. COOKE,
Government Astronomer.

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NOTES.

PRESENTATION TO J. L. NEWMAN.—On Wednesday, 31st May, the officers of the Department of Agriculture met in the Lecture Hall for the purpose of presenting Mr. J. L. Newman, an inspector under the Insect Pests Act, with a purse of sovereigns, on the eve of his marriage. Mr. C. F. Chaplin, the Director of Agriculture, occupied the chair, and in a few appropriate words made the presentation on behalf of the staff. After wishing him every happiness and success in life, the health of the guest, together with that of the then prospective bride, was honoured with enthusiasm. Mr. Newman, in reply, briefly thanked his brother officers and expressed his determination to do his duty to the Department in a manly way.

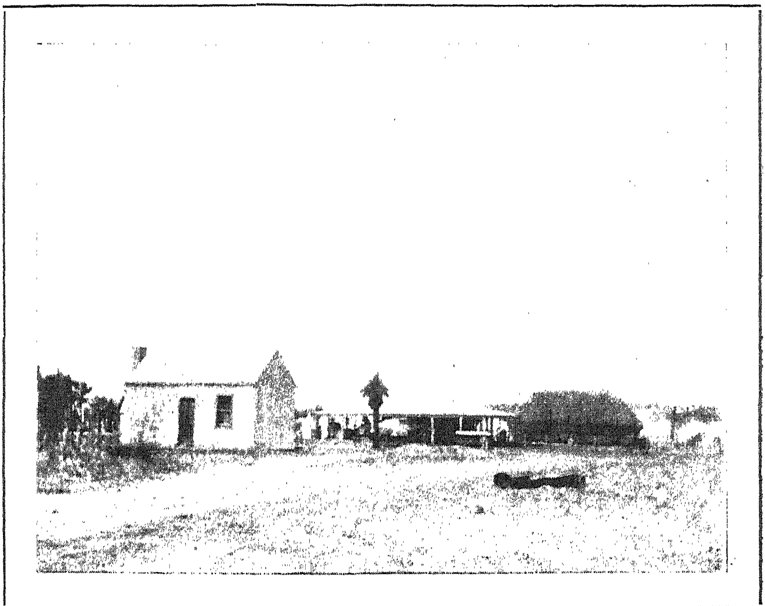
OFFICIAL WELCOME TO THE NEW DIRECTOR.—After the presentation had been made, as stated in the above paragraph, Mr. A. Despeissis, on behalf of the staff, proposed the health of the Director, and stated it was the wish of the officers to welcome Mr. Chaplin as their official head. It might appear that the welcome came somewhat late, but the delay was certainly no inference against the Director. The opinion had been freely voiced that the new Director would prove equal to his credentials, hence the welcome was the more sincere. It was not vain *formula* in saying that the officers of the Department would give the Director their best endeavours to carry out his plans. Mr. Chaplin's genial character had made them all ready to help him in every way, and he trusted that Mr. Chaplin's name would, for a number of years to come, be connected with the rising work of the Department of Agriculture. Mr. Chaplin, in reply, said the toast had been sprung upon him. He had only been head of the Department for a little time, but in that short while he had come to the conclusion that the selection of officers under him was a very good one. He hoped they would find out that it was his intention to deal out justice to one and all. He only wanted them to do their duty, and if he could push any of them along he would be only too pleased to do so. The Department had a tremendous territory on which to operate and it was a big task he had undertaken, but he hoped to be able to map out a successful line of conduct for the future. He intended to take the people into his confidence, and, perhaps by this course of action, the Department could do better in the near future. If any officer made a suggestion that was anything good, that officer would get the credit for it. As far as he was concerned no man should hide his light under a bushel. In conclusion, Mr. Chaplin expressed the hope that, if at any time the officers had to give him a send-off, that their expressions of opinion concerning himself might be the same as those expressed that day.

THE BEEKEEPING INDUSTRY.—During May, Mr. Sutton, the Bee Expert, gave a highly interesting and instructive lantern lecture in the lower Town Hall, Albany, on bee anatomy and hive manipulation, which was much appreciated. Later in the month he delivered the same lecture at the school between Grassmere and Torbay Junction.

CLAREMONT DISTRICT POULTRY SOCIETY will hold their Annual Show on the 14th and 15th July, and entries close with Messrs. W. C. Byass, Hay Street, Perth; G. D. Oliver, tailor, Market Street, Fremantle; and the secretary, C. H. Evans, Bay View Terrace, Claremont, on the 8th July. A good show is expected, and in the Minorca Class a (special) £3 3s. cup is being offered. A pigeon flight is to be held during the afternoon on the second day; all the birds being liberated at a given time.

ATTENTION TO LITTLE THINGS.—It invariably happens that the most successful farmers are men who have always got something to sell, and look upon every branch of their occupation as being something which has to stand on its own bottom and show a profit. The men who succeed nowadays look after the little things with just the same keenness as they do the greater concerns, and by having their eggs in a number of baskets do not run the same risk of failure as if their whole was embarked in one venture. Muddle has been responsible for more farming failures than anything, and by muddle we mean that too common practice of putting money in one's pocket with one hand and taking it out with the

CHAFF-CUTTER at work on Afghan's (Abher Khan) Farm.



S. FROST'S FARM. Holding, 355 acres; cultivated, 260 acres; fencing, 3 miles (6 wires). On the land three years.

other, but without any statement of account or check on the expenditure. There are scores of farmers to-day who may be paying their way, but they do not know how they are doing it, and there are others who have gone under, but might have averted disaster had they known just where to put their finger on the leakage, and at once stopped it. If a tiny side branch on the farm only returns a profit of a single sovereign in a year, it is worth looking after and taking account of; and it is the man who has all these strings in his hand and pulls them steadily who is qualified to succeed. Of course, every branch of the farm will not pay at the same rate, and in some seasons will not pay at all, but these uncertainties make it all the more necessary that we should know just how we stand.—*Mark Lane Express.*

OILING HARNESS.—The following is a method given for oiling harness:—If the leather is dirty it should be washed with Castile soap and hung up to dry. Before entirely dry the harness is ready to be oiled. Take a sheet-iron washing tub and fill two or three inches deep with machine oil, using the best oil that is recommended for oiling binders and mowers. Dip all the parts of the harness so as to cover well with oil, giving the leather time to get saturated with oil. Then hang the pieces of harness over the tub to drip, and when dripping ceases rub all parts with a coarse cloth—flannel is best. By using machine oil as above there will be no danger of rats or mice gnawing the harness. The following is another good recipe:—Two quarts of fish oil (neatsfoot oil will do, but the fish oil is distasteful to rats and mice), 2lb. mutton tallow, one pint of castor oil, ¼lb. lampblack, ½lb. beeswax, ¼lb. resin, and 2oz. of pure tar, boiled half an hour over a slow fire. Use cold. To make your harness look new, apply after oiling it a dressing made of one pint of neatsfoot oil, a large tablespoonful of lampblack, and an ounce or two of beeswax.—*The Farmer and Stockbreeder.*

APPLICATIONS FOR ORNAMENTAL TREES.—A very large number of applications have been and are still being received by the Department of Agriculture for the supply of ornamental trees and shrubs. In every instance the applications have been forwarded on to the Forestry Department, under whose control these trees come; and as the Department of Agriculture has nothing to do with the Forestry Branch, it would expedite matters for the applicants if they would write direct to the Acting Inspector General of Forests.

DATE PALMS FROM ALGERIAN SAHARA.

By A. DESPEISSIS.

In the course of a recent visit to Algeria I was much impressed with the importance which the cultivation of the date palm occupies in the agriculture of that country. Western Australia, in many respects, offers natural conditions similar to those which obtains in Northern Africa, and the promise of the successful cultivation of the date palm over wide ranges of country, situated in the hotter and drier portions of this State, is so encouraging that, with the authority of the Minister for Lands, it was decided to introduce some of the best date palms procurable.

Early in November last the British Consul at Algiers was accordingly requested to procure and ship, to the order of this department, a consignment of date palm suckers or "djebars" (as the Arabs call them) from the choicest varieties grown around Biskra, in Northern Sahara, beyond the Atlas, and also one from some varieties better adapted to coastal climate and successfully cultivated on the plains between the Atlas and the sea.

These suckers are removed from the parent tree about April, as date palms must be planted when the hot season comes. This probably accounts for the delay that has occurred in transmitting the consignment, the first portion of which Mr. F. Hay-Newton, the British Consul at Algiers, advised on the 12th April last.

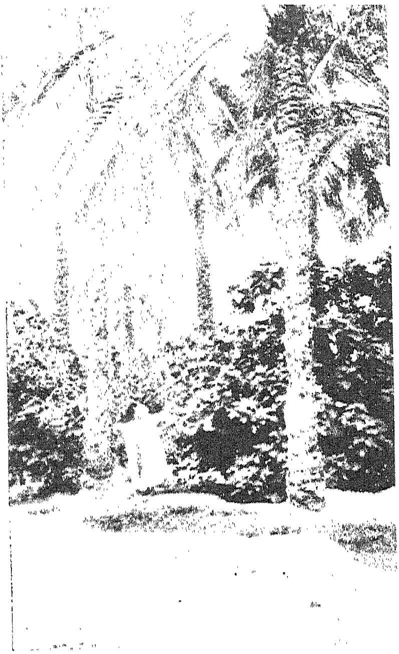
I yesterday unpacked it, for inspection and disinfection in the ordinary way by hydrocyanic acid gas, at the fruit shed at Fremantle.

As the consignment, in spite of the enormous distance and the lengthy voyage, arrived in very good order, it is interesting to note, as a guide for future consignments, the method of packing.

The suckers, 60 in number, were packed in large cases 5ft. long by 2½ft. Eight holes, securely covered with wire gauze, four on each side, provided the necessary ventilation. The suckers, which weigh from 20 to 50lbs., had been headed back to a height of 3ft. to 4ft., the outer leaf stalks being tied together to reduce the space required and to afford protection to the tender shoots inside.

These suckers had their butts as well as their leaf stalks wrapped up in moist "lif" or date palm fibre, and moist wood-wool which helped to keep them fresh and does not encourage the growth of moulds. The cases were shipped as ordinary cargo. The varieties received are: 25 Deglet-Noor; 25 Rhars and 10 male suckers.

(1)



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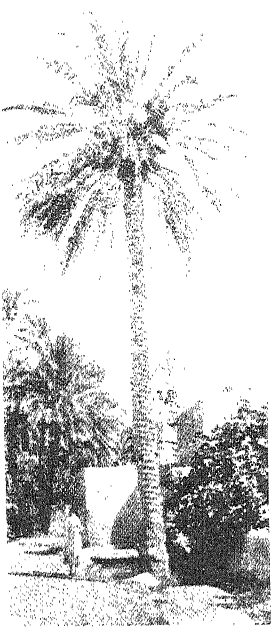

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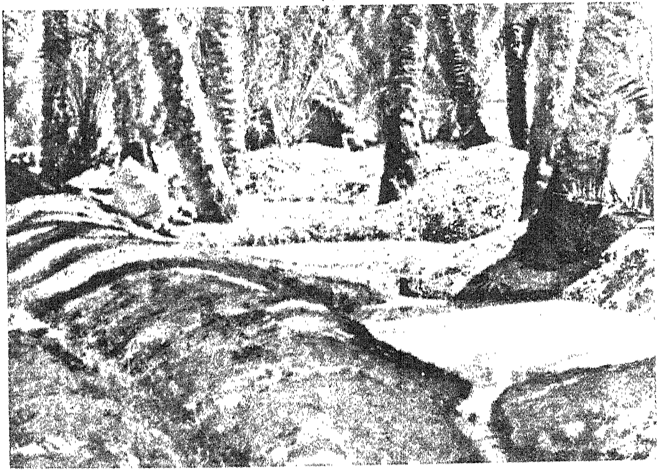
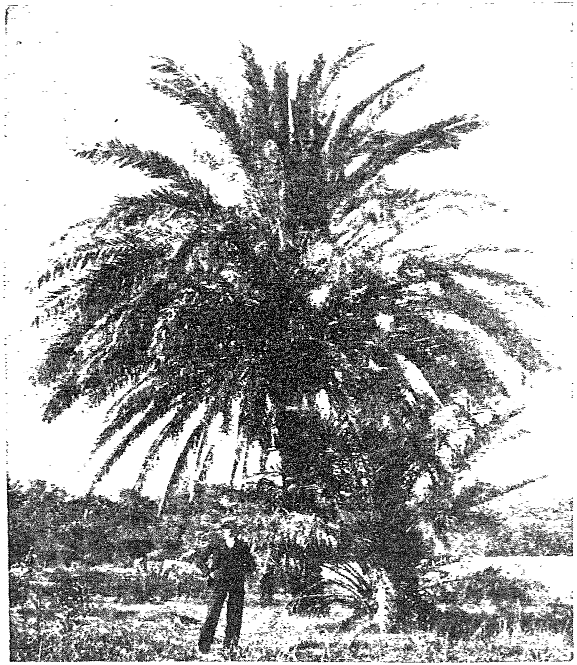


1. Fig Trees growing beneath Date Palms, near Biskra, Algeria.

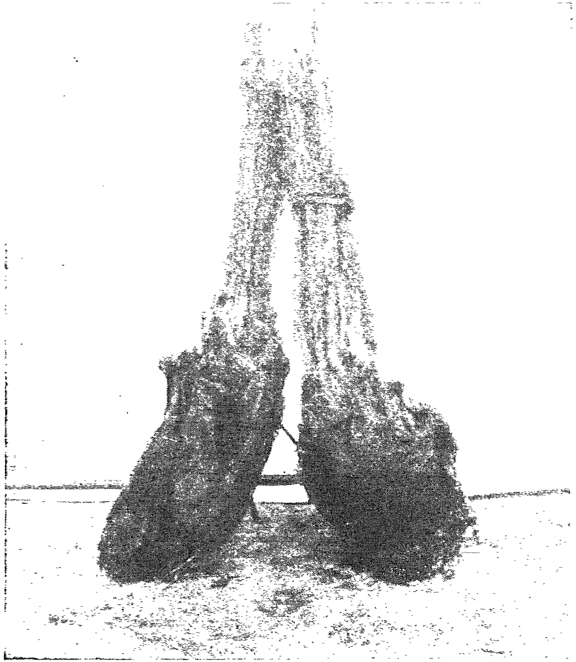
2. Fig Trees growing beneath Date Palms in Biskra.

3. Irrigation of Date Palms at Biskra, Algeria, showing three excavations through which water is flowing.

U.S. Department of Agriculture Yearbook, 1900.



Sᴇᴇᴅʟɪɴɢ Dᴀᴛᴇ Pᴀʟᴍs growing at Claremont, Western Australia.



Dᴀᴛᴇ Pᴀʟᴍ Oғғsʜᴏᴏᴛs ᴏʀ "Dᴊᴇʙᴀʀs," introduced into Western Australia from Biskra, Algeria.

(Photos by A. Arnold).

The Deglet-Noor, "the date of the light" of the Arabs, is the choicest date known; it is a fairly late variety, amber-coloured and translucent when ripe, with a soft melting flesh and an excellent flavour. It does best where well irrigated and fertilised, and in localities beyond the influence of sea breezes and where the season is hot enough to mature it.

The Rhars may do better at the North-West, as it ripens earlier and may not be spoilt by the summer rain. It much resembles the Deglet-Noor, but is softer and more syrupy and is a vigorous variety; it is extensively cultivated both by the Arabs and the French colonists of Algerian Sahara.

The male suckers introduced are not selected with the same care, as, for the purpose of providing the pollen for fertilising the blossoms of the female trees, any male seedling or sucker therefrom will do, and these can be procured locally. The few "djebars" were, however, introduced so as to provide each experimenter with both male and female date palms at the same time.

The present consignment would best be distributed amongst several applicants, who at an early date have expressed the desire to experiment with some. The plants should be given to them with the understanding that they will return to the department, whenever ready, an equivalent number of suckers to that received.

The applicants are:—

(1.) Mr. W. H. Cussack, of Messrs. Cussack & Meares, "Tambray," Roebourne, who have already been very successful in raising some excellent dates at their station.

(2.) The Trappists' Mission at Beagle Bay, which boasts of the first tropical orchard of any extent established in Western Australia.

(3.) Mr. Jas. Lauder, Narra Tarra, Chapman River, who has in readiness a piece of land very suitable for date palms.

(4.) Mr. S. E. Hocking, the president of the Goldfields Agricultural and Horticultural Society, and the owner of a very successful garden at Kalgoorlie.

(5.) The Goldfields Water Supply Board, who have initiated, along the water-pipe line, gardens cultivated under irrigation.

(6.) The Hamel State Experimental Station, where a few of the suckers left could be sent to, not with the object of fruiting the trees, but as a reserve, wherefrom supplies of suckers could be drawn for planting in more suitable localities.

I will say that the Deglet-Noor and the Rhars, both have their home in the region of the Oued Rirh, of which Biskra is a prosperous centre, and at present the terminus of a line of railway which, running over the Atlas, covers a distance of about 300 miles from the seaboard to the northern boundary of Sahara.

In that locality, just South of the foothills of the Atlas mountains, which rise at the north and successfully intercept the sea breezes, large depressions or "chotts" occur, which are 20 to 80 feet below sea level. There a number of artesian bores have brought to the surface some of the water which occasionally runs in the Saharian rivercourses, or oueds, and a number of palm groves have, in consequence, been added to the natural oasis of the country. The extreme of temperature are very marked there, and range from 20° F., or 12° of frost in the clear winter nights when the radiation is active, to 150° F. in the summer, or a difference of 130° F. It very seldom rains in that locality, which is a fortunate circumstance for the date palm crop. When planting a grove this point should be carefully considered. The plant may grow luxuriantly in a humid and a mild climate, but will not bear so profusely as if growing in an arid climate, dry in the spring, at blossoming time, provided that the roots be almost permanently growing in springy land.

THE DATE PALM.

The recent introduction from Algerian Sahara of a consignment of date palm suckers referred to in the above report, addressed to the Director of Agriculture, suggests, concerning the cultivation of that useful tree, some further notes, which I propose to embody in this paper.

LOCAL MARKET.

Reference to the Customs returns shows that the consumption of dates in Australia amounts to 1lb. per head of the population, or well-nigh 4,000,000lbs. of that commodity are imported annually. Under the Commonwealth Customs tariff dates come in under especially favourable terms, and only pay 1d. per lb., whereas currants pay 2d., and raisins and other dried fruit 3d. per lb. This apparent anomaly is due to the fact that at the time the tariff was framed Australasia did not produce any dates at all, whereas the currant, raisin, and dried fruit industries were already established and appeared worthy of support.

With the attention that the cultivation of the date bids fair to receive in sub-tropical Australia, and in those watered patches of country which are everywhere dotted over the arid portions of this continent, there is no reason why dates should not meet with the same encouragement that other dried fruits do, and thus take rank amongst other profitable agricultural industries.

Good as the local demand is the prospect of the consumption increasing to an extent difficult to foretell seems encouraging when it becomes possible to place before the consumer a much fresher date, as compared with the necessarily stale article offered for sale after the first few weeks following the first shipments of the new crop dates.

Moreover, when it is considered that fresh dates bear to the dried fruit somewhat the relation that ripe grapes bear to raisins, some idea may be gathered of the possibilities which date culture offer in a country like this.

CLIMATE.

Following on the announcement that this Department had received a consignment of date palms from Algeria applications for suckers came from every centre in Western Australia, a great many of these altogether unsuitable for the proper ripening of the date. Those from Katanning to Beverley and from Bunbury to the Swan could not be entertained, the climate being too mild and moist for that tree of the desert. Climate more than soil needs to be considered in connection with the date palm. It does best where the air is torrid and hot from the time the fruit sets in the spring until it ripens in the autumn. The date palm zone is an immense one, although it is by no means anywhere within that zone that the tree succeeds to perfection. Failure in connection with its cultivation is often due to the fact that some imagine that the tree is fitted for any hot, arid desert. The conditions that best sum up the likings of the date palm find expression in an Arab proverb:—"The date palm, the queen of trees, must have her feet in running water, her head in the fire of heaven." It is a fact worth noting, that a very dry atmosphere favours the production of dates of high quality, the best being produced in the hot atmosphere that is characteristic of the climate of Persia, of Arabia, of Egypt, and of Sahara. The numerous oases of that region, remote from the cooling and humid neighbourhood of the sea, are famed for the excellence of their dates. In fact, heavy rain followed up by a few days of cloudy weather at the period of the ripening of the fruit at times spoil the crop.

A mean annual temperature of 72deg. F. (22deg. C.) is deemed necessary, but during the time of ripening, a mean temperature in the shade of about 80deg. is required even for early varieties, and a few degrees higher where late varieties come into bearing. An occasional rise to 104deg. to 111deg. F. (40deg. to 44deg. C.) is found helpful. This explains why, at Algiers, at Nice, or at Naples, where the average summer temperature is about 63deg. F. (17deg. C.) the date palm does not mature its fruit, although it grows luxuriantly enough, and is on that account largely cultivated as an ornamental garden tree or for supplying pot plants for room decoration.

From the foregoing it must not be inferred that, like many tropical plants, the date palm cannot stand any degree of frost. In the true sense of the word it is not a tropical plant, but rather a plant of arid regions, where, on account of the clearness of the air, great extremes of temperature are recorded. In the oases of Sahara, for instance, around Biskra, famed for its dates, although the thermometer at times records 113deg. to 120deg. F. (45deg. to 52deg. C.) in the summer, when the desert wind or *sirocco*, also called *simoun*, blows, it occasionally, during the starry winter nights, when the earth radiation is active, drops to 20deg. F. (7deg. C.).

As the date palm is dormant in the winter frost has no action upon it.

In Western Australia large stretches of country present features somewhat analogous to those which prevail in date-growing countries.

From Geraldton, in Champion Bay, to Broome, in Roebuck Bay, with a coast line of over 1,000 miles, and in places inland in the Coolgardie and the Murchison goldfields, we also find a climate that will suit the date palm almost to perfection.

Local experience in this respect fully sustains deductions drawn from analogy.

At "Tambray" station, 60 miles inland from Roebourne, Messrs. Meares and Cusack have for years grown dates, for the excellent quality of which I am able to bear testimony. Tambray is by lat. 21° S., with an altitude of over 1,000 feet above sea-level, and has an average rainfall of 14 inches.

An interesting account of the enterprise in that direction, published in the April, 1904, issue of *Dalgety's Review*, states that some 28 years ago the owners of Tambray raised a female date palm on another station, 25 miles south of Roebourne, but although it flowered profusely the fruit never came to maturity, owing to there being no male plant in the vicinity to fertilise it with its pollen. How this difficulty was surmounted, I will mention further down. Now they have three females bearing and three males, besides several dozen coming into bearing, and some young plants.

Other trees, growing a few miles from Geraldton, at Mr. Cream's place and at Mr. Twine's homestead on the Avon, between Northam and Toodyay, bear and occasionally ripen very good dates.

SOIL AND WATER.

Only of second importance to climate are the quality of soil and of water in connection with the successful cultivation of the date palm.

All kinds of soil will do, provided the moisture is at the feet and the requisite dry heat at the crown of the tree. When, however, the kind of soil can be chosen, a lean, sandy soil with a small percentage of clay, such as produces the best dates of the desert, will be preferable. If that soil is charged with salts it matters little.

As regards water, it is quite as accommodating, but it will not do in stagnant pools; no plants will, unless they be essentially aquatic plants. The tree will, however, flourish where the water table is permanently found two or three feet below the surface. Any water good enough for stock will do for this palm.

In the desert of Sahara, where the date palm flourishes to perfection, it is not found scattered in clumps almost anywhere, but only in moist patches where soaks occur, or in the ravines of watercourses, called *oueds*, which now and again carry the torrents from the Atlas mountains towards the large depressions or *chotts*, some of them 20 to 80 feet below sea-level, which occur in that region.

Since the comparatively recent days when the first artesian well was bored in that region, hundreds more have been sunk, with the result that a striking transformation has occurred in the appearance of that country: where a small clump of date palms once grew, extensive plantations now occupy the land. Not only do the trees enjoy a high atmospheric temperature, but the high temperature of the artesian water as well seems to force them into more luxuriant growth.

A parallel instance is noted here, where, I have it on the authority of Mr. W. H. Cusack, two dates, male and female, grow at "Millstream" station, near Tambray. The trees, about 17 to 18 years old, grew from seed alongside a thermal spring with a temperature of about 90° F. The female is more than twice the size of the male, though both are of the same age and grown under the same conditions. That female tree is also as large as the one grown near Roebourne referred to above, and which is ten years older.

The illustration, borrowed from Mr. Swingle's report and published in the *Year Book*, United States Department of Agriculture, 1900, gives an idea of the customary way of irrigating palm groves near Biskra. Trenches are excavated alongside the trees, which are occasionally filled with water.

Although the trees will do well where the ground is kept fairly constantly moist, it also adapts itself to circumstances, and in a climate not too arid, such as is met with on the grassy plains of our North-West, they are doing fairly well when copiously watered once every three months for the first year. The second year, says Mr. Cusack, one good watering between the rainy seasons is sufficient; after that no further watering in ordinary seasons is required.

That parsimonious treatment may do to save young trees from perishing, but it stands to reason that when bearing the strains of a crop of fruit more frequent waterings would yield good results.

Much of the moister land in the North-West of Western Australia is found on the low-lying alluvial banks of rivers and torrents; and it is satisfactory to note that the large tree previously referred to as growing 25 miles south of Roebourne has many a time been under the flood-water in the bed of the creek it grows in, and has also withstood without damage the willy-willies or cyclones which occasionally sweep that part of the coast.

When irrigating by flooding, in the height of summer, it is customary with the Arabs to turn the water on late in the afternoon, or at night, to prevent scalding.

Too much water at the time of blooming, or immediately after, affects the proper setting.

PLANTING.

In the state of nature the date reproduces its kind by seed when the fruit has been fertilised, or by means of suckers, which the Arabs call "djebars."

The tree is *diœceous; i.e.*, some individuals are pistillate, or female; others are purely staminate, or male. Grown from seeds, about half the number of resulting palms are male and about half female.

When seeds are planted they are months before sprouting, the kernel being enclosed within a hard, horny shell. In Persia germination is quickened by filing the stones at both ends until the kernel is laid bare. They are then planted in a mixture of gravel, sand, and camel manure. In two to three weeks the young plants begin to shoot above ground.

The more common mode of reproduction, however, is by "suckers."

Like begets like, and by getting the suckers from the best trees the kind is reproduced without variation.

In the case of the male plants this is less important, although the sexes should, as far as possible, bloom simultaneously. For that reason it is advisable to begin the plantation with a greater number of male trees, which may afterwards be cut down. One staminate to 20 to 50 pistillate trees will do.

When suckers are used those 12 months old are generally used for local planting, as being smaller they are easily detached from the mother plant. If sent a long journey suckers weighing 20lbs. to 30lbs. are preferable. These are detached just before planting in the spring—in March and April in Algeria. In doing so care should be taken not to wound the mother plant too deeply.

The suckers should not be set deeper than their outward leaves, as if set too low the irrigation water would too often reach the heart, and cause it to perish.

Every four or five years the Arabs uncover the surface roots and give a dressing of camel and sheep manure.

POLLENATION AND PRODUCTIVENESS.

The growth and development of the date palm is not constant everywhere. Where the soil is suitable, the moisture sufficient, the summer heat forcing, and the amount of attention given to the plant adequate, the date will bear about four or five years from the seed. As suckers save a year at least, that time is proportionately reduced when they are used.

WARDING.

GRUBBER'S CAMP on T. D. O'Driscoll's Farm.

Under ordinary conditions, however, seedlings do not bear before they are six to eight years old, and offshoots four to six, after planting. They come into full bearing when 10 to 12 years old, and continue bearing if well cared for until they are 100 years old or more.

The flowers are white, and carried on an inflorescence, not unlike a horsetail, which at first is wrapped up in a sheath; the male flowers on one tree and the female on another.

The male inflorescence is thinner than the female, and the blossoms have petals with stamens laden with pollen. The female flowers, on the other hand, are deprived of petals, and only have pistils and ovaries, which show at first like little white knobs.

When growing wild the wind and insects distribute the pollen about sometimes to considerable distances. Under intense cultivation the process of fertilisation is helped by bringing the twigs of male flowers into direct contact with the female flowers. This permits weeding out a considerable proportion of unnecessary male trees.

On young trees the fertilisation is done without much labour, but as the trees grow high ladders have to be used to reach up to the flowers. The Arabs and Moors, however, dispense with ladders, and climb the branchless trees with the help of their hands and bare feet, or by means of a rope passed round the loins, while they press their feet against the trunk, which they embrace with both hands.

The male inflorescence is cut off just as it is ready to expand; it is then divided into fragments, with a dozen or two flowers on the twigs; these are tied with a piece of leaf to a female flower, and the operation is done. This is done in the early spring. Each plant produces from half-a-dozen to twenty flowery stalks, and as they do not all blossom at the same time the artificial fertilisation has to be repeated as often as the flowers are ready.

A couple of bunches are as much as a young tree can well carry, and even an old and vigorous tree should not have more than a dozen bunches on it.

If the flowers have been fertilised two of the three fruits produced from each flower fall, leaving a single date. If, however, the flowers have not been fertilised, all three dates generally remain attached and continue to grow, crowded and deformed. They are seedless, never properly mature, and are of no value. Such unfertilised bunches are best cut off.

It is not necessary to have fresh pollen produced right alongside the female trees, and male inflorescence can be carried long distances for the purpose of fertilisation.

Mr. Cusack's experience is, that when collected from male blossoms, carefully dried in the shade and kept free from mould, pollen is capable of fertilising pistillate dates months after it has been gathered.

As soon as they are fecundated the little white knobs turn green and swell, and after seven or eight months, on nearing maturity, they turn light red, different shades of yellow, or waxy white, according to kinds. As maturity proceeds these colours deepen; they cease to be opaque, and become more or less translucent, sweet, are slightly astringent, and develop a peculiar and a pleasant flavour as they ripen. They are marketed, and then constitute a great delicacy.

For long keeping and distant market, however, they must undergo a certain amount of drying.

For that purpose they are left on the trees until all the tannin they contain has been turned into sugar. They shrivel up a bit.

If not dry enough, they may be spread to dry for a day or two, when they are ready to pack.

It is estimated that they shrink one-fifth their weight when drying.

The production of an adult, well-grown tree is fairly heavy. Each bunch of fruit weighs 12 to 20lbs.: as it can easily carry six to ten bunches, it is safe to reckon the average crop of a tree at 1cwt. Unfortunately the date palm does not bear uniformly a good crop every year, and generally fruits heavily every second year.

VARIETIES.

Some kinds bear better than others, and of varieties there is a great number. These differ mostly as regards their season of ripening, the shape and the colour of the fruit, and their degree of excellence.

Some, especially seedlings, remain astringent even when fully ripe, and have little more than skin over the pit. Good edible dates go three to four to the ounce, and the proportion of flesh to pit is about eight or ten to one.

Choice varieties do not have a tough skin or a parchment-like covering of the pit.

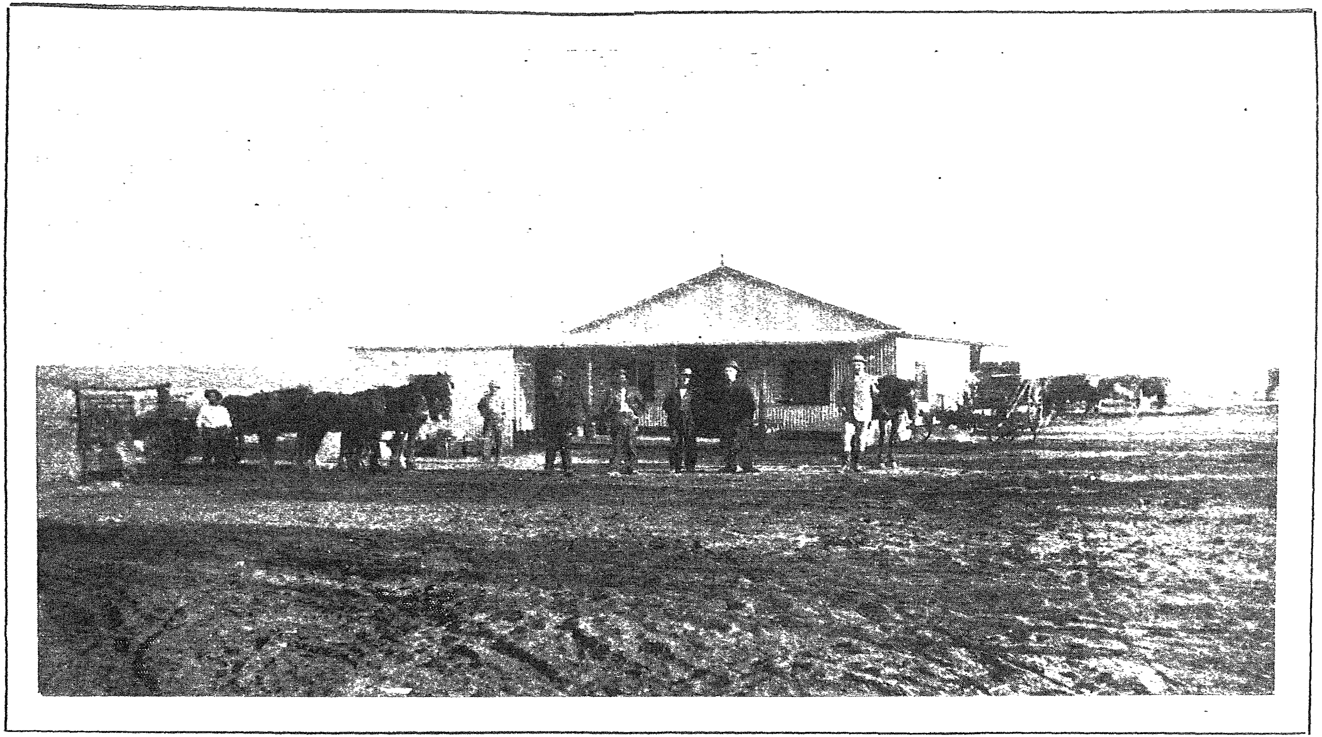
In Algeria three distinct types of dates are known, which again are subdivided into varieties—early or late, elongated or oval, clear or dark.

One variety is so syrupy that it is hard to cure and pack, and it is for that reason seldom shipped, but consumed locally like grapes.

Two early varieties of this type, the Amaree and the Tedmana, which are susceptible of fruiting in less arid regions, are examples of syrupy dates.

A second type, and one which yields excellent "soft" dates, is the one best suited for drying and export. The flesh is very sweet, containing more than half its weight of sugar. Some varieties are a little syrupy at first, but they cure without trouble.

The "Tambray" dates grown by Mr. Cusack belong to this type.



WARDING.

T. D. O'DRISCOLL'S HOMESTEAD. About 410 acres cultivated. Twelve months on the land.

The "Rhars," an early-bearing, strong variety introduced by this Department from Biskra, is another date of this type.

The "Tedalla" is another variety which belongs to this group. According to Mr. Swingle, the agricultural explorer attached to the Washington Department of Agriculture, it is a large date, often three inches long, and ripens about the same time as the Rhars. The tree is extremely vigorous, and bears large crops of fruit. It is also sufficiently early to mature its fruit during the rather short and relatively cool summer of the coastal region. Suckers of this variety are on order, but have not yet reached Western Australia.

The "Deglet Noor," the "date of the light," a later variety, also belongs to the soft dates type. It is cultivated throughout Western Sahara wherever the season is long enough to enable it to mature. Not so soft as the Rhars, it possesses a delicious flesh, which tastes of honey and nutmeg combined. Unfortunately it is not a very vigorous variety, and does not fruit heavily unless well fertilised and irrigated. The Deglet Noor is one of the kinds recently introduced into Western Australia.

The third type comprises hard, floury dates, which are collected as they drop down from the tree, and which, although less tasty than the other two, are more nourishing, and, as a staple article of food, are preferred by the Arabs. They keep for years when protected from weevils. It is the date carried by caravans travelling long distances across the desert.

NITROGENOUS BACTERIA FOR LEGUMINOUS CROPS.

By PERCY G. WICKEN.

Some short time ago the Department of Agriculture obtained from the United States of America some of the cultures made by Professor Moore, of the Laboratory of Plant Physiology of the U.S.A. Department of Agriculture, for the purpose of inoculating the soil with the bacteria necessary to enable the leguminous crops to take their supplies of nitrogen from the atmosphere. Only a small quantity of the bacteria was obtained, and as it could not be distributed in packets as received, it was decided to make a quantity of the cultures and inoculate the seeds with it, and then distribute the seed to all those who applied for the same. This has now been done, and during the past week a large number of packets of inoculated seed have been distributed to all those who sent in their applications for the same. One culture will not do for all leguminous plants, but a different culture is put up for each species, such as garden peas, clovers, common peas, lucerne, cow peas, soy beans, vetches, etc., and many of the cultures require to be prepared in a different manner to the others. Those received by the Department were for common peas, garden peas, and red clover. The culture for common peas was sent to the experimental farms, where a quantity of seed will be inoculated and sown. That for garden peas and red clover was made up in the office, the seed inoculated and distributed to applicants, together with a packet of uninoculated seed for the purpose of testing the difference in growth between seed which has been inoculated and that which has not been inoculated. Arrangements have been made to take samples of soil in several places before the seed is sown and have it analysed. Samples from the same part will be taken again after the crop is harvested, and when analysed the increase in the percentage of nitrogen in the soil, if any, due to the bacteria, will be ascertained. The advantage of the leguminous crop in a rotation is that it takes its nitrogen, which is the most expensive of fertilisers, from the atmosphere and retains it in the soil. By means of this bacteria, which forms small nodules on the roots, the plant is enabled to take a much larger quantity of nitrogen, and not only increase its own growth, but to store up in the soil a supply for the next crop. The effects on a crop of wheat, following a leguminous crop, are generally most marked, and where the roots of the leguminous crops are well covered with bacteria the soil will be enriched to a considerable extent.

The bacteria is put up by the United States Department of Agriculture for distribution in small packets sufficient to do 10 gallons of liquid; the culture itself is in a dry state, snugly put up in a small piece of wadding, and then wrapped in silver paper and kept air-tight. A bucket of rain water is required, and into this a quantity of sugar and sundry other materials are required to be dissolved. The wadding is then dropped into the bucket, and in 48 hours the bacteria are at work, and the water becomes of a milky-white colour. It is then ready for use, and may be poured over the seed with a watering-can, the seed being well stirred during the time, or the seed may be dipped into the solution. The seed is allowed to dry, and should be planted within 14 days to obtain the best results. The following season the soil will probably contain this bacteria, and can be taken and spread over the ground where a similar crop is to be grown, and by this means the crop will become inoculated. In the event of it not being convenient to inoculate the seed, the culture can be put on the ground with a fine watering-can or spray pump, and the bacteria will soon find their way to the roots. Or, in the case of a growing crop, a quantity of soil can be inoculated and scattered broadcast over the crop and the soil will become inoculated.

So far no cultures for inoculating the lucerne plant have come to hand, but as this is one of the most important of the leguminous plants the Department is still endeavouring to obtain a supply. The Department of Agriculture in the United States of America have taken out a patent for the making of these cultures for the benefit of the public, and by this means are enabled to prevent anyone from securing a monopoly of the trade of selling these cultures to the public, as no one else can now secure a patent; and the method of preparing the cultures has been made public to those interested in the manufacture. The competition between vendors should result in the cultures being obtained by the public at a reasonable price.

INSPECTION OF RE-PURCHASED ESTATES.

By C. E. MAY, Chief Inspector of Lands.

I have to report, for the information of the Hon. the Minister for Lands, that I have completed an inspection of the following re-purchased Estates. I will lead off with—

MT. HARDY,

which is adjacent to York, and comprises some 9,000 acres. This area was subdivided into 96 lots of various acreage and thrown open for selection six years ago. Prior to the Government acquiring the estate, the improvements were about 26 miles of sheep-proof fencing round the external boundaries, a few wells, the timber ringbarked, and patches of cultivation, probably 200 acres, together with the old homestead. Owing, however, to neglect, these improvements had considerably deteriorated, and the land was used occasionally by one man for the depasturing of a few sheep.

To-day there is not a vacant block, the whole area having been allotted to 30 selectors, who have effected such improvements as 45 miles of substantial six-wire fencing, 3,750 acres under cultivation, and other improvements, such as dwellings, wells, etc., which I assess at £1,200. The whole of these improvements, exclusive of the original work referred to above, I estimate at £6,120, or an amount equal to 11s. 3d. per acre.

The foremost in developing their holding are undoubtedly the Wheeler Bros., and have performed marvellously good work in a short space of time. Their property, containing 648 acres, is sheep-proof fenced, 380 acres of which is either in fallow or ready for the plough; there is a fine brick house, with every convenience, substantial stables, a barn, machinery shed, forge, etc., and a nice little orchard coming on. Excellent judgment and forethought have been observed in building up the place, which might well be described as a perfect model of a farm, and should serve a splendid object lesson to stimulate others to do likewise.

N. G. Hooper, a goldfields selector, has also accomplished most useful work; his holding contains 1,013 acres, which is substantially fenced, and subdivided, and 560 acres under cultivation.

N. Stack holds 850 acres, of which 770 acres is in crop, and the whole fenced against the trespass of sheep.

J. S. and W. Hogan, John Taylor, McQuade, Kindelan, and others have performed proportionately good work.

There are no procrastinators. On the contrary, one and all appear to have an abnormal amount of determination and muscular power in denuding the land of its virgin growth to bring it under (as it is to be seen to-day) a sea of fallow.

WOODLANDS

comprises about 1,450 acres, and was subdivided into 10 blocks and allotted to six selectors in May, 1903. Before the attainment of this estate there were no improvements of any description; the magnificent agricultural land simply lay waste, and was a harbour for vermin, benefiting neither the owner nor the State. Since it has fallen into the hands of its present tenants a transformation scene has taken place. Where the stray stock used to roam is now substantially fenced against all such trespassers. The fencing erected amounts to 12½ miles; 270 acres have been brought under cultivation, and other improvements to the value of £200, totalling a valuation of £900, or a rate of 12s. 3s. per acre. In passing, I cannot omit to mention the excellent work effected and in progress by Mr. Isbister, a goldfields selector, who will have 100 acres in crop this season, besides other good work done during the last two years.

COLD HARBOUR

is the most favourably situated area of the three; it adjoins the town boundary of the municipality of York, and lies between Mount Hardy and Woodlands. It was subdivided and thrown open for selection in 1903. Fifteen selectors became the fortunate possessors of the entire area, which was formerly used by one man for a handful of sheep, so to speak. The original improvements consisted of about 14 miles of inferior fencing and promiscuous patches of cultivated plots, probably totalling 200 acres. The present holders have completed 14 miles of superior fencing and cleared 850 acres for cultivation, and expended on other improvements fully £600, making a total valuation (*ex* previous work) of £2,256, or a rate of 6s. 6d. per acre.

It may be mentioned that Mr. Hoops, with his two able-bodied sons, also selectors, have effected good work, being probably the most progressive. S. F. Brownley, J. Shanhan, T. Lott, and others have, and are daily improving their holdings.

These three estates, containing valuable agricultural land, lie side by side, and were formerly occupied by three individuals at scarcely any advantage to the State. Now the land is supporting 51 selectors, who in the aggregate have fulfilled improvements to the value of £8,406, which is a modest assessment. The benefit the State derives by the acquisition of the above estates is apparent.

I append a few photos. of some of the homesteads in order to convey a better impression of the development in progress.

[EDITORIAL NOTE.—Mr. May mentions, at the end of his report on these particular estates, that some of the settlers have had to start without any capital basis; and to make ends meet have gone to work for their better-off neighbours. Surely this is the type of settler we require! One that will not calmly sit down and say, "the Government put me here and they must help me," but one that is willing and able to stand to his manhood and say, "I will help myself as much as I am able."]

GWAMBYGINE.

Having just completed a block to block visitation of the repurchased estate of "Gwambygine," a few facts regarding same may prove of interest. I therefore beg to submit the following report, for the information of the Hon. the Minister:—

This valuable estate of over 9,000 acres, situated within eight miles of York, on the banks of the Avon River, with the main line of railway and road traversing its eastern portion for four miles, was acquired by the Government and thrown open for selection in 1901. The only improvements then existing thereon was the well known homestead of "Gwambygine," now owned by the then lessee, Mr. Hicks. The improvements consisted of, approximately, eight miles of fencing and small patches of cultivation, which in all did not exceed 300 acres. During something like 40 years that the lessee occupied the area he only depastured 2,000 sheep on country that, when fenced and ringbarked, is capable of carrying nearly a sheep to the acre. The area might be described as heavy jam and York gum country, undulating to hilly in places, with large granite outcrops; but where these outcrops appear in the somewhat rough hills the land is heavily clothed in grass, probably some of the finest feeding hills to be found in the Avon Valley. The area was subdivided into 36 blocks, which were allocated to 17 different selectors, who, judging from appearances, are well satisfied with their venture.

Amongst the foremost in effecting substantial improvements may be mentioned Mr. C. R. N. Clifton, formerly a Nor'-West squatter, who, by indomitable pluck and hard graft, has more than fulfilled the prescribed improvements in about four years or less, and has acquired the fee-simple of his holdings, over 700 acres. Mr. Clifton's homestead, a pretty stone building, is located by the side of a huge granite rock at the base of "Cane" hill, which, with a cultivated field in the foreground, gives his home a quaint but picturesque aspect.

The old Gwambygine veteran (Mr. Hicks) and his two capable sons have shown marked activity in executing good work since the fortunate day he relinquished the lease of the estate, which carried a high rental, to become the happy possessor of 970 acres of exceptionally good agricultural land.

Mr. Young (from the goldfields), whose endeavours tell a tale of what can be done with fairly heavily-timbered land in a short space of time under his dexterous management, he will probably have 150 acres under crop this coming season.

The Messrs. Ovens (three brothers), J. M. Smith, C. S. Conch, and others, have also shown correspondingly good work.

The national benefit derived by the acquisition of this estate may be gleaned by the fact that, when the Government purchased the property, one man practically used it for a sheep walk, whereas it is now supporting 17 selectors, each assisting in building up our State asset.

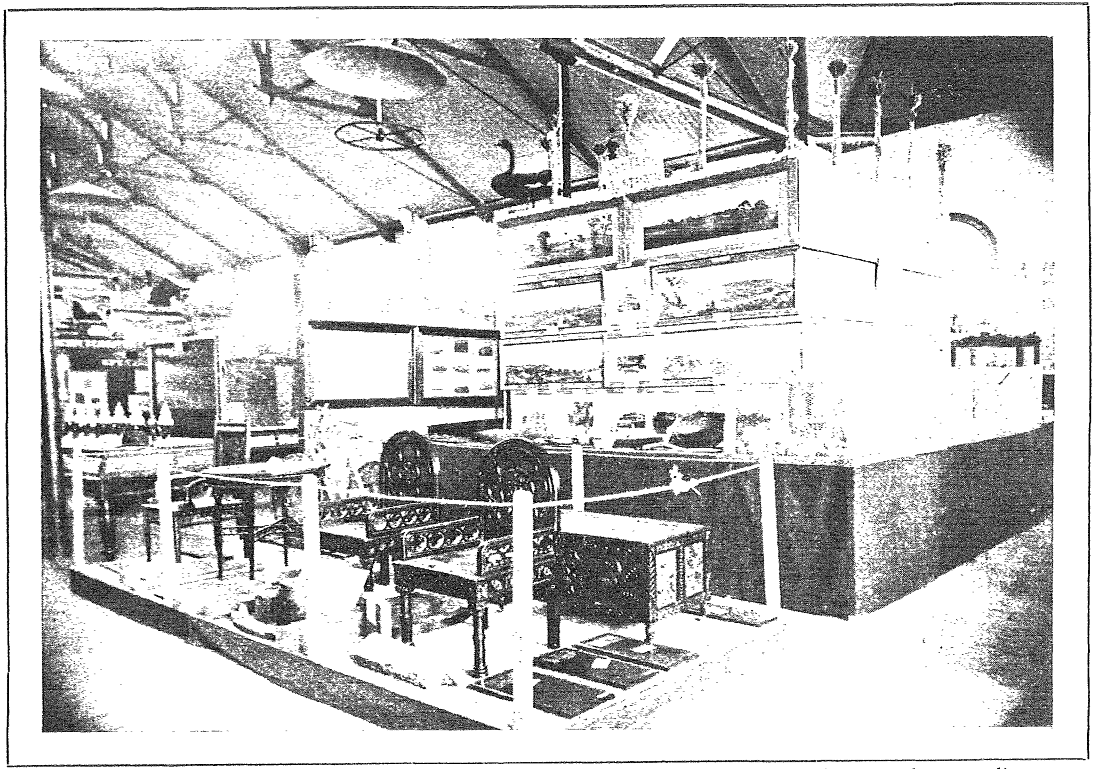
At the present time there are over 80 miles of substantial six-wire fencing, roughly 3,500 acres of ringbarking, and, in round numbers, 1,000 acres of clearing. The total value of this work, as a fair average, may be placed at £4,000. In addition to the improvements some of the selectors have a considerable number of stock, including horses, sheep, and pigs. I might add that, with clearing and ring-barking, springs of excellent water have broken out on almost every holding.

ADELAIDE EXHIBITION.

Mr. P. G. Wicken, the officer who was in charge of the West Australian exhibit at the Exhibition recently held at Adelaide, has put in the following report to the Director:—

"I returned from Adelaide on 8th May, and have since received all the exhibits back, and have unpacked them and distributed them to the various departments from which I obtained the loan.

"The Adelaide Exhibition proved a great success, both as an attraction and financially. The total attendance was estimated at 150,000, and of these people nearly all came to see the West Australian Court. Although the papers were not inclined to be favourable to us exhibiting, the public took a great interest in the matter, and the West Australian exhibit and Western Australia were one of the topics of conversation during the exhibition.



THE WESTERN AUSTRALIAN EXHIBIT at the recent Exhibition held in Adelaide, South Australia.

"Both directly and indirectly I think the exhibit has done Western Australia a vast amount of good, and during the whole time people were coming in making inquiries about Western Australia, and obtaining information about the land, and other questions of interest, and I was kept constantly occupied in supplying information on all subjects, and, I think, as a result of the exhibition, that a good number of people came to the West, some with the intention of remaining, and some to have a look round and see for themselves.

"The only other State that had an exhibit besides ourselves was New South Wales, and as they sent no one in charge their few exhibits were put into a case and hardly anyone saw them. Such an exhibit is useless and a waste of money to the State concerned, as the dust laid so thick on the cases at times that the contents could hardly be seen, and there was no one to supply any information.

"A space of 20 x 15 feet was allotted to us, but this was not sufficient for our requirements, and, after some trouble, I managed to secure some extra space, which enabled me to make a fairly creditable display, and I think I can say that our exhibit was as attractive as anything in the Exhibition.

"The Hon. the Premier visited the Exhibition while passing through, and has spoken well of our display. A large number of West Australians also called in during the six weeks of the Exhibition, and had a look at the Court. A large quantity of literature about the land, the caves, and statistics on all subjects were distributed, and so many inquiries were made that I had to engage assistance to look after the exhibits and distribute literature. The exhibition was open from noon to 10 p.m. every day, and on Saturdays and holidays from 10 a.m. to 10 p.m., making a long day for those in charge.

"A lot of criticism about Western Australian land, etc., appeared in the papers when the Exhibition opened, but on my receiving permission to reply to same I saw the editors of both papers, and also inserted a contradiction to the statements. This was published, and from that time until my departure no further mis-statements had appeared.

"As to the financial side of the exhibit, this will, I think, prove very satisfactory. The expense has been very light compared with the benefit derived from the exhibit as an advertisement for the State."

FRUIT PACKING.

By A. DESPEISSIS.

Improved methods of packing fruit are every now and again illustrated in the pages of this *Journal*, and reference to the *March*, 1904, issue will show that attention has already been directed to a useful fruit tray for marketing such fruit as figs and peaches, which are the hardest to pack.

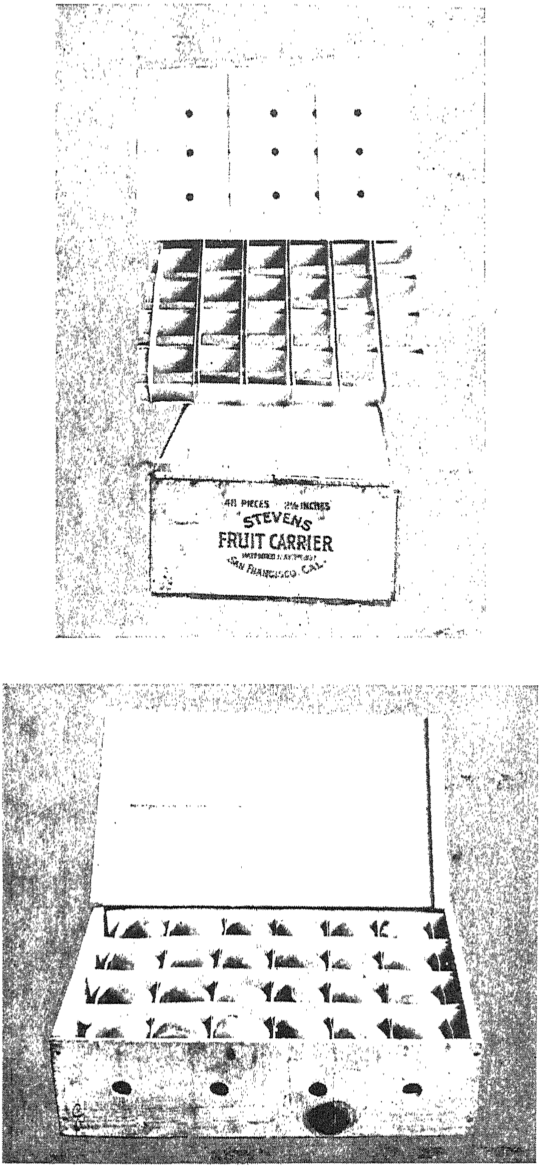
A pear tray of similar design and superficial area, but varying slightly in dimensions, is also now used with good results in the United States and in Tasmania. Like the peach tray illustrated in the issue mentioned it takes one layer only, but whereas the dimensions of the peach tray used at Woodbridge are 23in. x 16in., and varying in depth from 2in. to 2¾in., the pear trays referred to are 30in. x 15in. and 3in. in depth.

Last summer I had the opportunity of seeing some excellent peaches packed at Woodbridge in an improved fruit carrier, which is now illustrated. Although of excellent quality, the peaches were rather too ripe to have stood the test of the ordinary packing cases met with in our orchards. In the carrier referred to they were being sent daily, both to the Perth and the goldfields markets, and everywhere realised top prices. Mr. Walter Harper, when on a visit to California last year, was so impressed with the advantages of this package that a consignment was, at his instance, sent to Western Australia in time for packing some of the choice summer fruit at Woodbridge. To his courtesy I owe the specimen box which is reproduced to illustrate the notes relating to this carrier.

It is constructed on the principle of an egg box, with some improvements which adapt it happily for packing choice soft and ripe fruits. A large company, styled "the California Fine Fruit Company," was formed a couple of years ago to manufacture this patent package, and they named it the "Stevens Fruit Carrier." Although the box proved in every respect highly satisfactory for the purpose for which it was designed, financial difficulties have since supervened which, unfortunately, according to a recent issue of the *Californian Fruit Grower*, forced the winding up of the company.

As the principle is thoroughly sound and the construction of the simplest, new life may before long be infused into the business, and it should meet with that measure of support and general patronage which it deserves.

Concerning the utility and merits of this box, the testimony of Mr. P. Duffy, of Sydney, whose firm is one of the largest handlers of green fruit in Australia, is of value. "In 1902," says Mr.



FRUIT CARRIER FOR HIGH GRADE AND RIPE FRUIT.

Top fig. shows cardboard diaphragm and cells with double partitions.

Duffy, "while on a visit to California, the fruit carrier here illustrated was brought to my notice and a trial shipment of pears, tomatoes, peaches, and plums to Auckland was so encouraging that I followed it up by another of five hundred boxes of similar fruit, right on to Australia." He was advised by cable, on the arrival of the ship at Auckland, that the fruit in the patent boxes was in perfect condition, but that packed in the ordinary way was a total loss. He next shipped 2,000 boxes of pears, and on arrival at Sydney, three weeks after shipment, they were found to be in equally as good a condition as the Auckland shipment before mentioned.

The year after, Mr. Duffy, while on another visit to California, secured a supply of boxes from the factory at San José and shipped over ten thousand boxes during August, September, and October, with similar satisfactory results. A consignment of these, consisting of three hundred boxes of pears, was examined at Sydney, after three weeks' voyage, and the ripe ones were sold there, the hard ones were sent on to Durban, another three weeks' run from Australia, and they arrived in perfect order and sold at high prices.

The boxes sold to retailers in Sydney, Mr. Duffy further states, "were repurchased, filled with pears in January, 1904, and sent to Cape Town, thence to London, where they arrived in good order and sold at very high prices."

Oranges and lemons packed in these carriers, owing to the isolation and to the air cushion which surrounds each fruit, undergo a curing process and keep splendidly. Experience has shown that they can thus be shipped long distances as ordinary cargo, and without having to be stowed in cool chambers, which entails heavy freight.

This fruit carrier consists of a light box 18½ x 12 x 5½ inch measurement. Cardboard diaphragms, perforated for the sake of ventilation, keep the fruit away from the lid and bottom.

Two tiers of cubic cardboard cells fit inside the carrier as in an egg box, the difference being that the partitions between the cells are double, the spaces between the partitions being ⅜ of an inch, allowing for expansion and ventilation.

Between the two tiers a third diaphragm—shown resting over the cells in the top illustration—taps the bottom layer of fruit and serves as a floor for the top layer. Four light battens are tacked transversely at intervals across that diaphragm to lift it clear off the bottom layer and provide for a free current of air. The sides of the boxes are also provided with holes for ventilation. Two light transverse battens tacked across the lid keep it off the fruit and insure air circulation.

Half cases are made with one tier of fruit only.

The cells vary from 2 to 3 inches, with variations of ¼ inch, nd the number of cells is stamped on the head piece of the box.

Fruit grading thus becomes a simple affair, and as there is no need to wrap each individual fruit, much time is saved in packing.

The examination of the contents of the box is also of the simplest. The lid is taken off, and the top tier examined; the box is then reversed, lifted up, and the bottom tier is exposed to view.

For choice and fancy fruit, this package seems specially adapted. It also permits of fully ripe fruit being directed to distant markets. The carrier can be turned in any position without any excess of pressure being brought to bear on any singular fruit.

Although its cost is higher, the simplicity and rapidity of handling fruit, its better keeping and the higher price it sells for, all mean greater profit and often the difference between profit and loss.

THE FRUIT FLY PARASITE.

Mr. George Compére, the Government Entomologist, who has just returned from a trip to Brazil in search of the fruit fly parasite, has submitted the following report to the Director:—

"On 25th May I returned from Brazil, bringing with me a quantity of fruit fly parasites and predaceous beetles, *Staphylindæ* species. The beetles were at once liberated in the new insectary, where there was an abundance of food for them. When the cage in which they had been confined during their long voyage of 50 days was opened, it was noticed that there were quite a number of young larvæ in the cage. These were also liberated in the insectary, along with the adults. The parasites I brought in a dormant condition packed in the ice chamber of the steamer, and were placed in a breeding jar in the insectary.

"On 6th June, in company with Mr. Lowe, I visited the insectarium, and made an examination of the decayed fruits in the room, and it was at once apparent that the *Staphylindæ* beetles were breeding, there being young larvæ noticed in various sections of the room, as well as many of the original beetles; and we have every reason to believe that in a few months' time there will be a large number of the beetles for distribution in the State.

"On 7th June the first parasite issued, and no doubt others will issue during the next few days.

"Had the insectary been built a year sooner than it was, there would never have been any necessity of my having to visit Brazil the second time, as I did, to secure the present stock of parasites and beetles."

NOTES ON THE STATE FARM, HAMEL.

By G. F. BERTHOUD.

WEATHER.—During the past month we had a few nice warm days and a full share of the copious rains which fell over the South-Western Districts. The temperature remained very mild, and, on the whole, favourable for the growth of cereals and grasses. All the early sown plots have made good progress. The brook has risen considerably, but so far has not overflowed the bank.

WORK.—Ploughing and sowing was slightly delayed owing to the land being wet. A large number of varieties of grasses have been sown in small plots; later on these should prove useful and instructive to any farmer who desires laying down pastures. Several plots of new and improved sorts of cereals have been put in, but less than in former years. The maize plots have been harvested with fairly good results and will be reported on next month. The results of the rice and potatoe crops are noted below.

RICE—*Oryzasativa*—This valuable annual cereal plant requires strong, rich soil, combined with heat and moisture, for its successful culture. It is extensively grown in China, Japan, and the province of Lombardy, in Italy. The usual yield in those countries is from 40 to 50 bushels per acre. The lowland plots here are composed chiefly of a light swampy peat soil, which retains fair moisture throughout the season. A stronger and more loamy soil would be more suitable for this crop.

CULTURE.—Seed should be sown during the spring months, after the weather becomes mild and fine. Rice is a summer crop, and would not thrive if sown during the cold season.

SOIL.—Should be of good quality, deeply cultivated, well matured, and remain moist during the whole time of growth—say six months from the date of sowing—until harvested.

SOWING.—Here the seed was sown thinly in shallow drills 18 inches apart, complete fertiliser applied in the drill with the seed at the rate of 2cwt. per acre. Under favourable conditions the seed germinates in about ten days.

HARVESTING.—When mature, during the autumn months the crop may be harvested and threshed like wheat. The straw remains green long after the seed is ripe, and makes a useful hay or feed for cattle. After cutting the plant usually throws up a strong second growth, which makes good green feed for live stock during the late autumn months when feed is scarce.

GRAIN.—After threshing and winnowing the grain has a light brown colour and slightly rough skin, somewhat like barley, but smaller in size. The skin or husk is easily removed by milling, leaving the grain white and ready for use.

VARIETIES.—Five kinds were grown here during the past summer:—Two Egyptian; one Japanese; one Carolina; and one Italian.

The two sorts mentioned below, matured early, and gave good returns of nice plump grain. These two are most suitable for cultivation in the swamps of this and similar cool districts. The Carolina and others, although they made strong, healthy growth, failed to mature grain before the winter rains set in. All the varieties would be successful if grown in the warm coastal districts of the Northern portion of this State.

"*Bertone.*"—Variety from Piemont, Italy; imported seed sown 22nd October; germination quick and even; growth vigorous and healthy; foliage, wide, stiff, upright, of a pale green; straw strong, stands up well; height two feet, level and neat; headed middle of February; ears long, well filled, and beardless; ripe from end of March to early in April; does not come in as evenly as wheat; yield good, at the rate of 900lbs. per acre; grain plump; colour when husked, pure white, and of superior quality; early and prolific.

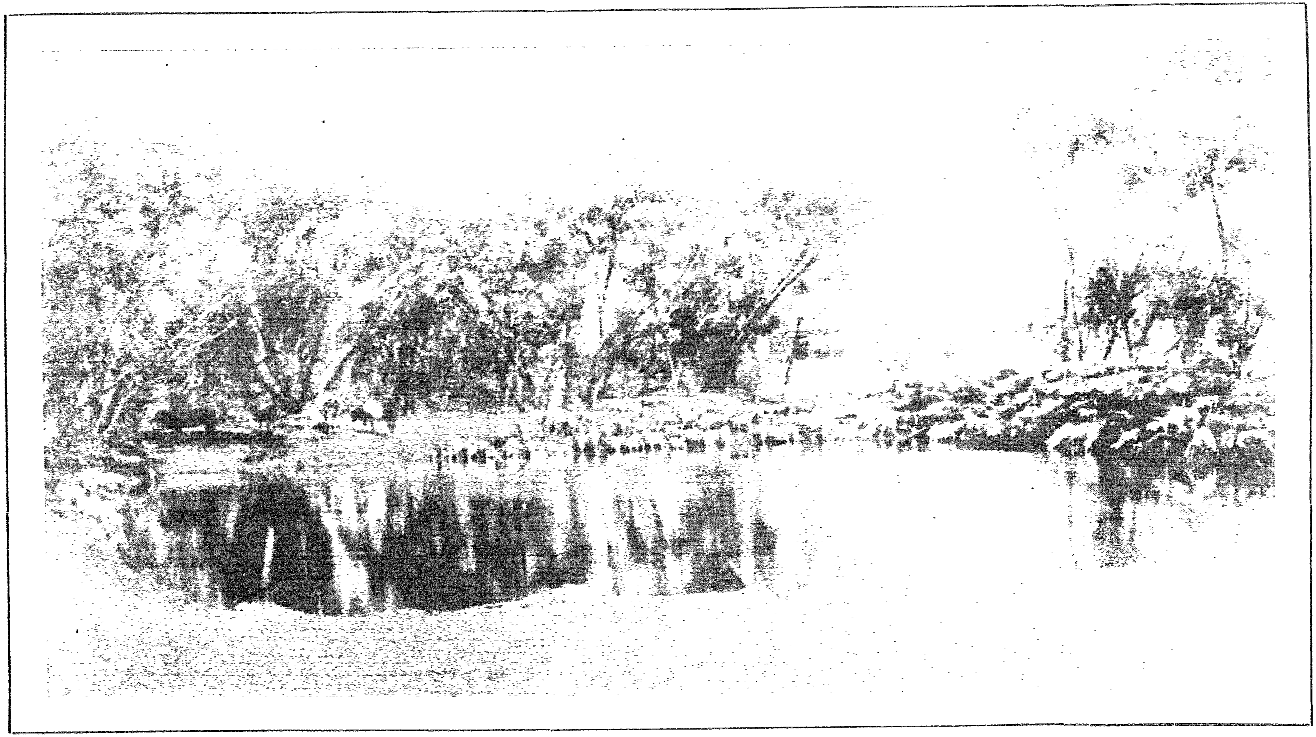
"*Yamani.*"—Egyptian variety; imported seed sown 23rd October; germination strong and even; growth upright and strong; straw stands up well; foliage wide, of a pale green; height 2ft. 6in.; very even; heads long, closely filled, bearded; ripe first week in April; grain long and fairly plump; yield at the rate of 900lbs. per acre; colour when husked clear white; appears to be of a very fine quality; early and good.

NOTE.—Progressive agriculturists who have suitable land and desire to experiment may obtain seed of the above named varieties by applying to the Director of Agriculture, Perth.

POTATOES.

The first four varieties noted below are first growth off tubers imported from Scotland, which arrived here early in January in very good condition. The tubers were of uniform medium size, well graded, and carefully packed, all sound, and showing strong healthy buds. Only three or four failed to produce good plants. The advantage of getting seed tubers from a cold climate like Scotland is that the tubers are generally sound and free from disease. They reach here nicely sprouted and just in time for summer planting in suitable moist lands. They germinate quickly, make vigorous plants, which yield full crops of clean, sound tubers, superior to the average local-grown seed. Growers would find that it would pay them well to obtain a change of seed annually.

SOIL.—New low land, situated close to the edge of the brook, quality light and peaty, retained fair moisture all through the growing season.



THROSSELL.

Public Dam at F. W. Roe's farm. (Constructed by E. V. Keane).

MANURE.—Complete fertiliser composed of four parts superphosphates, one part sulphate of potash, one part sulphate of ammonia, well mixed, and applied in the drills when planting, at the rate of 7cwt. per acre.

PLANTING.—Sets of whole tubers planted five inches deep in drills three feet apart each way. The haulm of potatoes set at that distance should, if well grown, cover and shade the whole surface of the soil. When set too close the usual results are weak plants and light yields of uneven-sized tubers.

"*Northern Star.*"—Planted 17th January, 1905; germination quick and even; growth fairly strong; foliage dark green and slightly curled; many plants damaged by grubs; height two feet; taken up 15th May; tubers white, round, skin slightly rough; average about 30 per plant. This variety requires good soil and heavy manuring to obtain the best results. This soil appears to be too light to mature large tubers. Fully one third were under market size. Yield at the rate of seven tons bare per acre. Cooking quality fairly good. Main crop variety.

"*Evergood.*"—Planted 18th January; germination even; growth fair; stalks somewhat slender and weak; foliage pale green, slightly curled; height two feet; badly damaged by the grub of the potato moth; taken up 15th May; tubers numerous, about one-fourth under market size; shape round; skin pure white, slightly netted; eyes shallow. Yield at the rate of seven tons per acre. Cooking quality fair. This variety requires a strong soil and liberal manuring to obtain a full crop of large tubers. Main crop variety.

"*Edward VII.*"—Planted 18th January; germination quick and even; growth healthy; stalks vigorous; foliage light-green; considerably damaged by grubs; height two feet six inches; taken up 13th May; tubers of nice even marketable size; few small ones; shape oblong; shallow eyes; skin smooth, of a pale yellow, flushed with bright pink; distinct and beautiful variety for show purposes. Yield good, at the rate of seven and a-half tons per acre. Will yield fair crops with moderate manuring. Keeping quality doubtful. Cooks well. Second early variety.

"*The Factor.*"—Planted 18th January; germination quick and even; growth healthy; stalks strong and upright habit; foliage large, dark green; height two feet nine inches; level and neat. Taken up 13th May; tubers large, set close to stalk, very few small ones; shape oblong or pebble; skin white, slightly netted; eyes set shallow. Yield good; at the rate of nine and a-half tons per acre. Showy and first-class market variety. Good keeper and cooker; main crop.

NOTE.—Seed, 28lbs each of the above four varieties was imported from Scotland. The tubers were planted whole. The "Factor" gave a return of five hundred-weight of nice, sound marketable potatoes. The other sorts did not give such good results.

SEEDLING POTATOES.

NOTE.—The following sorts are a few of the strongest which survived the carbon treatment mentioned in my last report. The growth of all was greatly retarded and weakened:—

"*20.*"—Planted 20th January; germination slow and very uneven; one-third failed; stalks weak; height 18 inches. Taken up 15th May; tubers fairly even; oblong; colour bright pink. Yield at the rate of four tons per acre. Cooking quality fair; yellow flesh.

"*25.*"—Planted 20th January; germination slow and uneven; growth fair; stalks strong; height 18 inches; taken up 15th May; tubers numerous; 27 to 40 per plant; rather small in size; shape round; colour of a pale pink; brighter about the eyes; handsome potato, but requires a long season to mature properly. Yield at the rate of 4½ tons per acre. Cooking quality good; flesh firm, tinted yellow.

"*36.*"—Planted 20th January; about one-half of this plot failed to come up; growth strong and healthy; foliage wide, of a dark green; height 20 inches; taken up 16th May; not fully matured; tubers round, bright red, of fair even size. Yield good, at the rate of 6¾ tons per acre. Cooking quality fairly good; flesh yellow.

"*78.*"—Planted 20th January; germination bad; only about one-fourth of this plot came up; plants weak; height 15 inches; taken up 15th May; tubers of nice even size; shape, flat, round; colour red; main crop variety. Yield, rate of four tons per acre; yellow flesh.

"*115.*"—Planted 20th January; germination bad, over half failed; growth strong; height to 20 inches; taken up 15th May; tubers large and round; colour white. Yield at the rate of four tons per acre. Cooking quality fair; flesh firm, of a pale yellow.

"*119.*"—Planted 20th January; germination bad, about one-third failed; growth strong and healthy; height 18 inches; flowers lilac; taken up 15th May; not fully matured; tubers of fair size; pink, round. Yield fair, at the rate of four and a-half tons per acre. Flesh yellow; cooks well.

Carefully-selected tubers have been retained from the above and other promising seedlings for spring planting. These, I trust, will yield a bountiful crop.

NOTES ON THE EXPERIMENTAL FARM, NARROGIN.

By FRANK FAULKNER.

I herewith beg to submit my report of the farm for May, 1905:—

An excessively wet month has been experienced, 6·78 inches of rain being recorded. The rain has retarded seeding operations very much, and, unless a dry June sets in there will be a great deal of land in the district left uncropped, as it is already arriving at the boggy stage. We have now some 120 acres sown, and what is sown is mostly started, but growing very slowly. Forty acres of rape sown last month is getting estabished, and with a few weeks' warm weather would give a lot of feed. Oats for ensilage, and most of that intended hay ground, is sown, also the manure plots—a comparative test of the chief classes of artificial fertilisers and mixtures of them has been got in on the most even piece of land available.

Ploughing is well ahead of the drill, and with fair weather we should get most of the crop—some 270 acres—sown by the end of June. A comparative test of all the best wheats I could get and small plots of grasses, lucerne, and such like fodder plants will be sown shortly, the ground being all prepared. In the garden a few lots of vegetables are well started, but with the cold weather they are not growing fast.

Clearing has not been a great success this month, owing to the excessive rain.

Poison grubbing has taken a good deal of the labour of the month.

The large north paddock, having again got a supply of water, is being prepared for the stock. The new well will now supply water for this paddock all through the summer, and we will thus be able to keep it stocked and so cope with the poison better.

The stock on the farm are all in fair condition, although the ewes, of which a good many have lambed, have felt the cold and wet weather.

The stud Shropshire ewes have not yet lambed, and no kids have dropped from the Angora goats yet. The goats are not thriving so well with the advent of the rain, and a waterproof shelter will have to be made for them.

The Dexter cattle—cow and bull—arrived safely early in the month, and are doing very well. The cow has since calved a sturdy little bull calf to Union Jack. Union Jack was champion at the

Royal Show of England, and winner of Challenge Cup of £25 in the years 1900, 1901, and 1902.

We have only two cows milking, the rest being due in a month to six weeks' time.

Pigs.—We have no stud stock for sale at present, all being on order, but two very nice sows are due to pig in a few weeks' time.

The fowls are well over the moult, but are laying very shyly, the wet cold weather keeping them back.

Grass on the farm is making a good start, but wants warmth to make it grow.

During the month we have received a second-hand oil-engine from the Coolgardie pipe works. It is not yet in working order, but can be put right at a moderate expense, and is certainly an acquisition to the plant on the farm.

THE THROSSELL AND WARDING ESTATES.

By C. E. MAY, Chief Inspector of Lands.

During May last, Mr. C. E. May, the Chief Inspector of Lands, made an inspection of the Throssell and Warding estates, and submitted his report thereon to the Hon. the Minister for Lands. In addition to the report, Mr. May sent along a number of photographs descriptive of the work done by the pioneers on these estates, and a number of them are here reproduced.

The report, together with the illustrations, should prove most conclusively the great value of land in this vicinity; and it is to be hoped that the work done and the results obtained by the people settled on these estates will be accepted as a criterion of Western Australian land as a whole, and not as a report on a specially selected fertile area.

The report reads as follows:—

"The Throssell and Warding properties, consisting of over 20,000 acres, better known as Grass Valley, was originally owned by the late Mr. E. V. Keane, who, at the time of his selecting, might justly be considered the pioneer of the district. When the Government acquired this large area of splendid fertile land Mr. Keane had the external boundaries substantially fenced, about 650 acres cultivated, large tanks excavated, and serviceable buildings (stone) erected at the homestead, which still retains the name of Grass Valley; and as long as the name survives so will that of

Mr. E. V. Keane, whose accomplishments contributed an excellent object-lesson for his neighbours. Seven years ago the Government purchased the estate, which was subsequently subdivided into 52 blocks of various sizes.

THROSSELL,

comprising 17,000 acres, was the first portion of the estate to be thrown open for selection. It is located about 10 miles from Northam, on the Kalgoorlie railway line. Applicants for these favourably-situated lands (within a 16in. rainfall, and unsurpassed in quality for the production of cereals, with the best markets at each end of the railway) were numerous; many of the blocks were applied for several times over, causing the Land Board, who adjudicated, a somewhat arduous task. Speculators, however, succeeded in securing lots, which they readily sold at a profit almost immediately afterwards to the unsuccessful but *bonâ fide* applicants.

"Twenty-seven fortunate selectors hold the entire area, most of whom are married men residing on their holdings in well constructed stone buildings, the interior of which reminds one more of the city than of farm life. There is a decided air of prosperity and contentment at every place. About 12 months ago the old homestead and lands at the Valley became the property of that expert lady farmer, Mrs. Maud Dempster, of Bucklands fame, whose name is so favourably known as a prize winner of high-grade stock at the district agricultural shows, more especially the Royal Agricultural Show. When Mrs. Dempster acquired Grass Valley the spacious stables, shed, etc. (built by Mr. Keane), were wholly inadequate for the convenience and comfort of her valuable blood horses. A visit to Grass Valley is an education to those interested in stock, especially the handling and management of the youngsters under the able mastership of Mr. Fred Dempster. In the loose-box can be seen the well-known racer Flintlock (Carbine-Duenna), and in the stables some of his young progeny. In a paddock an Ayrshire bull (the price of which was 100 guineas in England) may be seen, and in another, stud merinos, with a pure-bred kelpie on the alert for any emergency. Mrs. Dempster does not confine all her attention to stock. On the contrary, she is cognisant of the value of the producing capabilities of the soil, for in 12 months no less than 500 acres have been brought under the plough. Sheep also command attention, 2,000 being depastured in the ringbarked paddocks, those favoured being cross-breeds (Shropshire-Lincoln).

"Amongst the settlers who started in virgin country, and who have proved themselves worthy of their holdings, and whom the State should be glad to possess, may be mentioned Mr. F. R. Walsh (formerly a squatter in the North), as one of the most progressive. Strange to relate, Mr. Walsh was an unsuccessful applicant when the area was thrown open. The land he possesses (1,030 acres) was purchased from others who applied for it as a spec. During the seven years he has cleared and cultivated 873 acres, besides fencing and building a substantial stone house, outhouses, stables, etc. Mr. F. N. Roe, out of 705 acres, has cultivated 698 acres (the remaining seven acres being granite outcrop). He is a methodical farmer, and probably possesses one of the neatest homesteads, including stables, etc., on the area. A. Martin affords a splendid example of a man starting without capital. Out of his 665 acres he has cultivated 310 acres, and built a spacious brick homestead, and, as he states, 'the land built it.' The Frost Bros. (four), from the goldfields, hold 1,411 acres, of which 902 is cultivated. I could submit many more names of persons who are doing proportionately good work, but the few stated will give an idea of what is going on at Throssell.

"To demonstrate the transformation that has taken place, suffice it to mention that when the Government purchased the property there were, approximately, 650 acres under cultivation, and to-day there are 7,000 acres under the plough, over 110 miles of sheep-proof fencing, and other improvements (buildings and water conservation), which I value at £4,000, making a total valuation of £19,440. I have not included in my assessment the buildings in the little townsite at the Valley, which comprise agricultural hall, post and telegraph station, hotel, store, and other dwellings which have sprang up since the acquisition of the area, nor have I included the improvements effected prior to the land being thrown open. The remaining portion of the property, known as

WARDING,

containing 3,120 acres, and situated about 15 miles eastward of York, was subdivided into 13 lots, six selectors having acquired the whole. Amongst the foremost in improving his holding is Mr. T. D. O'Driscoll, who has cleared and cultivated 410 acres during the past 12 months. Mrs. Annie Marwick has cleared and cultivated about 300 acres, and erected a dog-proof fence round the 338 acres she owns. The total value of the improvements on this area I estimate at £1,500, which, added to my valuation of the improvements at Throssell, brings the amount up to £20,940 (exclusive of previous improvements).

"In conclusion, I may mention that I know of no similar area (and I speak with considerable experience of the agricultural districts of the South-West) that can compare in a like period with this for the development of the land. The selectors run their farms on purely commercial lines, and they recognise that every acre must bring in a return. The success which has attended the acquisition of this estate is apparent. What more convincing proof can be stated than the figures quoted of a modest valuation to demonstrate the wisdom of purchasing similar areas for close settlement? I attach a few photos., which will convey some idea of the substantial homesteads on these valuable areas."

THROSSELL.

F. R. WALSH'S HOMESTEAD. Holding, 1,030 acres; cultivated, 873 acres; fencing, about 14 miles.

EXPERIENCE WITH BRONZE TURKEYS.

FANNIE WARNOCK, Bates County, Mo.

Bronze turkeys have given me the best results and are raised most exclusively here. They will grow the largest in the shortest time. They mature early, are more hardy and domestic in their habits than other breeds. To be profitable, turkeys require much care and attention when young and should be kept from other fowls.

Young turkey hens lay more eggs and generally hatch more of them than older hens, but the gobblers should be two years old and of entirely different blood. To have thrifty young poults the tom should be changed every year, always using a thoroughbred. When my hens begin to lay, I keep them confined in boxes, having a box for each hen, have the hens marked with different coloured strings, always putting the same hen in the same box. After a week's time, each hen will have become accustomed to her box and will go there each day to lay. In this way I do not lose any eggs.

I gather the eggs each evening and keep them side by side in flat boxes, in a cool place, as it is important that they do not become chilled. About 40 degrees is right. It is also quite important that they be turned three times a week. Eggs so kept will hatch if five weeks old, and in that time a large number can be secured and perhaps there will be three or four turkey hens wanting to sit. If one should get broody before the rest, let her sit awhile, even a week, until there are others with the same notion.

I always set as many eggs as possible at one time. If I have more eggs on hand than the turkeys can cover, putting 18 under each hen, I put the rest under chicken hens. Each hen can cover 12 eggs. I try to have my flock all hatched at once, as it lessens the trouble in feeding. Of course there will be some hens still laying. In this case, save the eggs until you have a large number; then proceed as before. Each hen will begin sitting in her box, which is constructed without a bottom, as the moisture from the ground will insure a good hatch. Have in the nest a plenty of straw or hay to keep the eggs from rolling out and getting chilled.

Keep the boxes fastened at all times that the hens may not be disturbed, except about an hour in the afternoon. Then when the hen comes off for food it is well to guard the nest from dogs or chickens. Sprinkle sulphur in the nest and on the hen every week to kill lice. During the last week of sitting, sprinkle the eggs three times with warm water. When it is possible, examine the nest while hatching and remove the shells. When all have hatched, the same box may be used for a coop, if it is a large one. It is a mystery to me more people do not raise turkeys. They are mortgage lifters if handled correctly.—*American Agriculturist.*

EDEMATOUS PNEUMONIA.

By R. E. WEIR, M.R.C.V.S.

Either in conjunction with, or following on an attack of influenza, this form of pneumonia is not altogether uncommon. Like the former disease, it is infectious, resulting from a specific virus, yet there are many predisposing causes which act as important factors in aiding its development; such, for instance, as any influence which tends to lessen the general vigour of an animal. Cold, damp, and badly-ventilated stables are common examples in this direction; and in the country parts of the State it is often due to the erection of stables in such a position that the open-stalled animals are exposed to the prevailing winds of winter. A want of care is to be frequently met in rubbing down and thoroughly drying horses after a day's work; and the advantages of rugging during the cold season is usually entirely ignored.

Although this disease is often associated with influenza, its infectious nature is not so great, and seldom spreads beyond the animals which may be in immediate contact, and never affects a large number at the same time.

The symptoms usually develop slowly, and are somewhat similar to those noticeable in an attack of ordinary inflammation of the lungs. The animal appears dull and dejected, with an inclination to sleep. The appetite falls off, a more or less high fever and a cough, which is usually somewhat severe, are also present. The symptoms may continue for several days without any great variation. After an interval of about a week, however, more pronounced symptoms will appear; a rise in temperature is followed by hurried breathing, weakened pulse, and a more dejected look. A discharge, which may not have been present in the earlier stages, now flows from the nostrils, and this is usually of an amber-coloured appearance, although it may be almost pure blood during the later stages of the disease. The mucous membranes of the eyes, mouth, etc., become swollen and discoloured, the appetite fails, and the animal rapidly sinks and succumbs.

In some instances the symptons are more pronounced from the outset; hurried fever with severe breathing, weak pulse, and great depression is apparent; there are sudden variations in temperature, and weakness of the hind quarters is apparent when the animal is made to move; also, great waste of tissue, and dropsy of the dependent parts of the body occurs. In instances of this nature, both lungs are usually affected, and consequently, recovery is somewhat doubtful.

In the milder form of disease the symptoms generally subside from about the seventh day, and this is noticeable from the improved appetite and generally brighter appearance of the animal. The mucous membranes gradually assume their natural colour, and the heart beats are strengthened and restored.

In the treatment of this, or any other form of pneumonia, comfortable housing must be especially considered. If the stall is at all insanitary, or exposed to cold winds, the affected animal requires to be immediately removed to a well-ventilated loose box, and the body rugged. Great care is required as regards dieting, as by this means the animal's strength is supported, and extreme depression avoided. Rich, easily digestible food should be given frequently, but in small quantities, which must be varied to suit the animals capricious appetite. Mustard requires to be applied to the sides of the chest early in the complaint, and at intervals of four or five days throughout the complaint.

Medicinally:—Liquor ammonia acetate, 1oz., with nitrate of potash and camphor in ½oz. doses, will aid in relieving the fever and breathing. Alcohol or ether, in small doses, are also useful as stimulants to the heart and digestive organs.

EGG-LAYING COMPETITIONS.

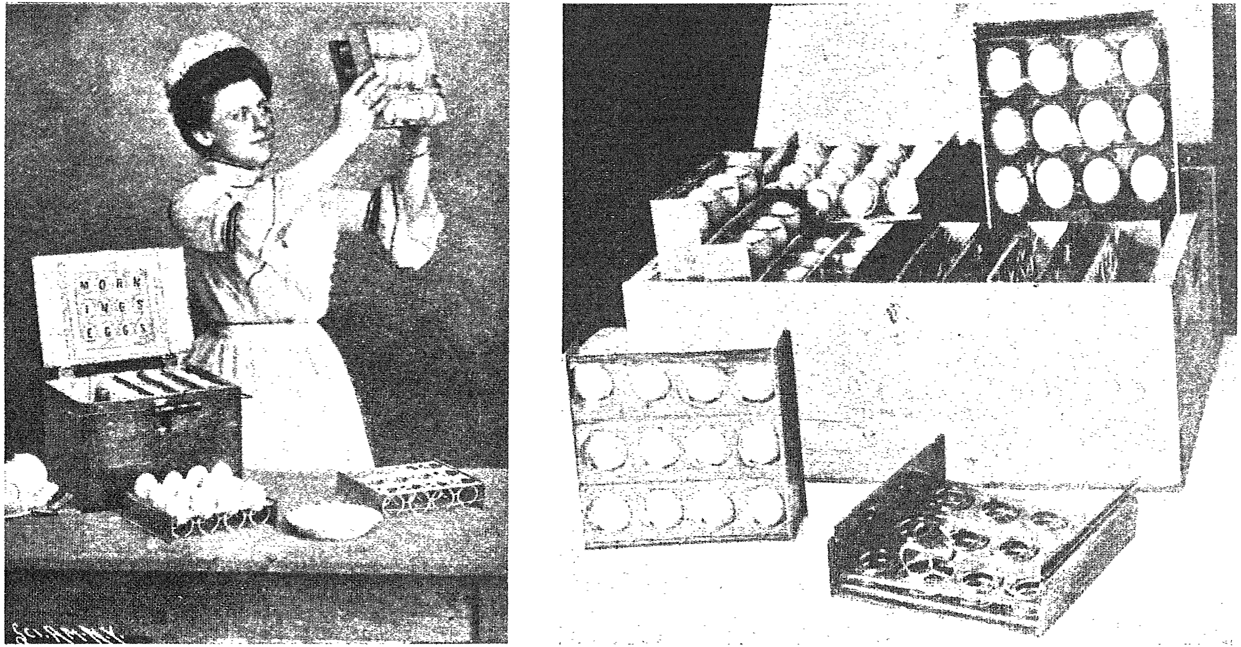
By FRANK H. ROBERTSON.

In another portion of this issue will be found a detailed account of the recent egg-laying competition, held at the Hawkesbury Agricultural College, New South Wales, by which it will be seen that a pen of Silver Wyandottes have won the prize for the greatest number of eggs laid, viz., 1,224, coming out at an average of 204 eggs per hen, which is a very good but not extraordinary record; but from this result it must not be definitely concluded that Silver Wyandottes are the best breed of fowls for a heavy egg yield, because, on looking down the list of competitors, it will be noticed that there are pens of the same breed in the vicinity of the bottom of list, and as a matter of fact they only come fourteenth in the list of breed averages, but as the 1903 competition was also won by Silver Wyandottes, these two important wins have been a grand advertisement for the breed, and of great pecuniary benefit to the owners who have had a good sale for their stock and eggs. This, of course, is a fine thing for the advancement of egg production all over Australia. In other competitions White Leghorns shine conspicuously, viz., in the nine months' Queensland competition, which closed on the 30th April, this breed scored first and second, Black Orpingtons being third. Then in the Victorian competition, White Leghorns are first, with the fine average of 218 eggs for the twelve months; Minorcas, second, 209; Black Orpingtons, third, 206. In this contest Black Orpingtons are also 37th and Minorcas 26th. In the South Australian competition White Leghorns are very successful, scoring first and second; Silver Wyandottes, third; and Minorcas, fifth, twenty-second, and last. With the exception of the first few pens, the results in this competition have been very disappointing. There seems to be something wrong somewhere, but what is wrong is hard to say; perhaps it is in the feeding, as at both the big Eastern farms great attention was paid to this question, especially at Dookie, where the principal (Mr. Hugh Pye) has gone into the question in a thorough manner.

The beginner in poultry-keeping, in his endeavours to fix on a breed, will, from these results, be somewhat bewildered, especially when it will be noticed how well pens of Langshans have scored at Dookie and Roseworthy, this being a variety not generally supposed to excel in egg production. The conclusion to be arrived at must be that, in determining the laying qualities of fowls, it is not so much a question of breed as of strain. Thus one person may have, say, Minorcas which will yield an average of 200 eggs each per annum, while another person may also have this breed, which will not average 100 eggs. There is another point well worthy of consideration, viz., the weight of the birds, as it will be noticed that many of the most successful birds were small. Take, for example, the first White Leghorns (219 eggs) only averaged 4½lbs. each; the fifth prize Pile Leghorns (202 eggs), 4⅓lbs. The second prize Minorcas, with an average of 209, weighed 6⅓lbs., thus making them a better all round fowl than the winners, but the seventh prize Langshans stand out stronger still in respect to all round qualities. Here we have hens with an average weight of 7lbs. each turning out the fine egg yield of 200. They are described as Langshans of the old short-legged type, and have certainly proved themselves an ideal all round strain.

These laying competitions are acting as a great impetus to the poultry industry in drawing attention to the fact, in a pronounced manner, that there is money in producing eggs; it also lets the public know the breeders who have stock of good-laying strains, and when details are given as to the quantities and constituents of the food used as prepared by the Principal of the Dookie College, particularly valuable and interesting data is supplied to those interested in obtaining the best combinations of foods to produce a profuse egg yield. The ration used consisted of:—

1 part wheaten chaff, soaked in water
1 part meat scraps
2 parts bran
5 parts pollard
8 parts wheat



A New System of Transporting Eggs.

The mash used as morning meal, the wheat being the evening feed, the total nutritive value working out at 1 : 4·89, which means 1 part of albuminoids to 4·89 parts of carbo-hydrates, thus forming a balanced ration.

The details and explanation of which will be further dwelt on in a future issue.

LIST OF FORTHCOMING POULTRY SHOWS.

9th and 10th June	Fremantle
16th and 17th „	Subiaco
28th, 29th, and 30th June, and 1st July ...	Perth
4th and 5th July	Boulder
7th and 8th „	Kalgoorlie
14th and 15th „	Claremont
14th and 15th „	Coolgardie
20th and 21st „	Albany
29th July	Gingin

NEW SYSTEM OF EGG TRANSPORTATION.

The egg men of this country have recently had called to their attention a new method of shipping and handling eggs, which has already been adopted to a considerable extent, and the use of which is becoming more and more general. Quite a large factory is maintained at Scranton, Pa., in the manufacture of the devices known as "Zinkets," which are the foundation of the new system. These zinkets are tray-like constructions of metal made by mechanical methods, each one of which holds one dozen eggs, and it is designed that the eggs shall be placed in these carriers at the time of their gathering on the farm, and in them they shall remain until such time as it is proposed to prepare them for consumption. When the zinket is empty, it is laid aside and returned to the dealer when a supply of fresh eggs is being secured.

This system is said to have a number of advantages over the method of packing the egg in horizontal layers with the aid of pasteboard fillers, as is done at present. In the first place, the zinket offers a most convenient means for carrying and handling the eggs through all the various processes through which they must pass from the farmer to the consumer. Secondly, the transportation of the contents of the packages is effected more safely than by the old methods, and the packages are smaller than those of corresponding capacity in use at present.

It has been said that the carrier is the basis of the new system. This is cut out of a roll of sheet metal, preferably steel, in an oblong shape, with 12 round holes placed regularly in the centre. These shapes are then electro-plated with zinc, as this is the most cleanly and desirable for the device. By subsequent passages through special machinery these holes are enlarged by cutting at the top and bottom. The strips thus formed are afterwards bent out from the metal body, and form clips over and under the hole, for the purpose of grasping the egg. The ends of the metal are then bent so as to form something of a tray, the ends being grooved to enable one of these devices to fit tightly in another. Thus, when packed, they are slipped into suitable boxes, vertically instead of horizontally. When in transit in this manner, the spring-like qualities of the clip consume all ordinary shock, and prevent the eggs from being broken. A very severe blow is required to dislodge the eggs from their resting places.

By this vertical arrangement of the trays, it is easily possible to examine and even count the contents of the box in a few minutes. For candling, the eggs may be examined in their places, and by a simple apparatus, invented for the purpose, the entire dozen of eggs may be carefully examined almost at a single glance. This is done without disturbing them from their places between the clips.

The safety of carriage is a feature which appeals to the dealer, and another important factor is the economy of space shown by the zinket system, for the carriers pack very closely. In shipping or storage they actually occupy 100 cubic inches less space per 30 dozen eggs than the pasteboard filler system. A feature which appeals to the consumer very strongly is the means afforded for the identification of goods. On each of these carriers the name and address of the owner must be stamped, in order that they shall find their way back to him. This enables the careful housewife to know just where her eggs came from. She will soon become familiar with the names of the farmers supplying her dealer, and she will reject the packages of any of those in which she has at any time found unworthy goods.

These devices have been already extensively used by fancy farmers, who supply what is known as "morning eggs." For infants and invalids it is often desired to have eggs that have been laid on the day of delivery. Here these carriers are the hasty messengers from the poulterer to the pantry. In order to give patrons further assurance of the quality of the contents, a strip label is pasted across each row of eggs in such a manner that it is impossible to remove one of the eggs without destroying the label.

After the package has been delivered to the house it is placed in the refrigerator, still in the zinkets, and in this shape it takes up much less room than the usual bowl. If it is desired to boil the eggs in numbers, as for a large family or restaurant, the entire arrangement is placed in the boiling water, and thus they are all cooked to exactly the same degree, a thing which has not been possible before without the use of some expensive device of a special nature.—*Scientific American.*

EGG-LAYING COMPETITION AT HAWKESBURY COLLEGE.

THIRD ANNUAL TEST.

GOOD RESULTS UNDER ADVERSE CONDITIONS.

PROFIT OF £248 ON 600 HENS.

The third annual international egg-laying competition, organised by the *Daily Telegraph*, and conducted at the Hawkesbury Agricultural College by Mr. D. S. Thompson, Government Poultry Expert, terminated yesterday.

The results achieved are perhaps of more practical service as an object lesson in the egg-production branch of the poultry industry than were the more brilliant doings of the previous year. They demonstrate that, under really adverse conditions, good payable egg-production can be secured. Such experiences are all evidence of the stability and possibilities of poultry-farming rightly conducted, and bring out the fact that a "lean year" can nevertheless be made a profitable one. The 600 hens showed a profit of £248 over the cost of feed. The attention demanded by this number of hens does not fully represent one man's work.

The falling off in the average egg yield for this competition, as compared with the records for the previous test, is simply a reflex of the difference in the weather conditions. In this respect Mr. Thompson was able to report of the 1903-4 competition: "The weather throughout was favourable to a good production of eggs. There was plenty of rain, but it was periodic. At no time did we have a spell of wet weather sufficiently long to interfere materially with the laying. The winter months were rather, dry, frosty, and cold, and as these frosts were followed by a fairly long period of damp, dull, cold weather well into the spring; the climatic conditions were undoubtedly in favour of the Asiatic varieties and adverse to the Mediterraneans." As will be seen below, the conditions were entirely reversed during the competition year just closed.

The competition was carried out on the most practical lines. The hens got the simple everyday treatment such as the poultry-keeper who had to make his living out of his birds could give. There was no fancy feed, but just the plain, wholesome diet that is available to anyone in the land; but, of course, the experience and constant observation of the management played an important part in tempting the layers to do their best under the circumstances. The influence and usefulness of such tests does not begin and end with the breeders immediately concerned. The main object of the promoters is to stimulate systematic breeding for egg-production, and in this respect the influence of the competitions has extended far and near throughout Australasia, and even beyond. Where there was one poultry-keeper two or three years ago who made egg-production a definite object by breeding from tested layers, there are now hundreds doing so. And this army of practical workers in the most important branch of utility poultry-culture is rapidly gaining zealous recruits, whose common objective is to breed fowls of a higher and higher standard of productiveness. It is not too much to say that their efforts in this direction are becoming an object lesson to the world.

The widespread interest in the competition was to some extent evidenced by the thousands of visitors who inspected the pens during the year. These not only came from all parts of the Commonwealth, but there were also visitors from New Zealand, America, Canada, England, South Africa, and Japan. In Mr. Thompson's opinion, "there is no doubt that this interest which the competitions are causing will be to the advancement of the poultry industry."

THE PRIZEWINNERS.

The prize money amounted to £140, and was won as follows:—

For the greatest number of eggs in the 12 months, G. Howell (1st), £15; J. Lowe (2nd), £11; J. M. Anderson (3rd), £8; F. J. Brierley (4th), £7; Mrs. E. Scaysbrook (5th), £6; S. Ellis (6th), £5; V. J. Zahel (7th), £4 10s.; A. J. Byrne (8th), £4; Oceanside Poultry Farm (9th), £3 10s.; W. H. Peters (10th), £3; J. Potts and Mrs. J. J. Roche (equal 11th), £2 5s. each; Royle Poultry Farm (13th), £1 10s.; C. Bridekirk (14th), £1; F. J. Powney (15th), £1; Mrs. A. H. Hansel (16th), £1; W. Cook (17th), £1; Dr. J. Martin (18th), £1; W. Wild (19th), £1; A. Wedlick (20th), £1.

For the winter test (first four months): G. Howell (1st), £5; W. H. Peters (2nd), £4; Mrs. E. Scaysbrook (3rd), £3; Royle Poultry Farm and C. H. Wickham (equal 4th), £2 5s. each; D. J. Stephens (6th), £1 10s.; E. Solomon (7th), £1; W. H. Tombs (8th), 10s.; Mrs. N. Kirby (9th), 10s.

For the market value of eggs in the 12 months:—G. Howell and J. M. Anderson (equal 1st), £3 10s. each; Mrs. E. Scaysbrook (3rd), £2 10s.; J. Lowe (4th), £2; W. H. Peters (5th), £1 10s.; Mrs. A. H. Hansel (6th), £1; Royle Poultry Farm (7th), 10s.; F. J. Brierley (8th), 10s.

For the last three months (moulting period): V. J. Zahel, 339 eggs (1st), £3; Mrs. J. J. Roche, 311 (2nd), £2; Bonaventure Poultry Farm, 308 (3rd), £1 10s.; G. Howell, 306 (4th), £1; J. M. Anderson, 299 (5th), 10s.

For the first month (open only to Australasian pens laying 70 eggs or more): J. Gamble (1st), £2; G. Howell (2nd), £1 10s.; D. J. Stephens (3rd), £1; A. J. Byrne (4th), 10s.

Monthly prize of £1 for the highest total from a pen: April, J. Gamble (111 eggs); May, Mrs. A. H. Hansel (113); June, W. H. Peters (113); July, J. B. Smith (125); August, Mrs. E. Scaysbrook (120); September, F. J. Brierley (130); October, F. J. Brierley (154); November, F. J. Brierley (153); December, V. J. Zahel (147); January, A. Arnold (127); February, Bonaventure Poultry Farm (114); March, W. Cook (118).

The Turner Trophy, presented by Mr. C. J. Turner for the greatest value of eggs from a New South Wales pen, G. Howell.

THE WINNING PEN.

The chief merit of Mr. George Howell's performance in finishing at the head of the list is that he has considerably improved upon his excellent record in the previous competition, when he beat all the Australian competitors in the six months' winter test. The work of his hens was marked more by consistency than by brilliancy. They laid well from start to finish, and were never lower than fourth. From third place the first month, they went to first in the third, and maintained their lead until the close of the winter test. After easing back in the summer, they headed the list in February, and finished with 31 eggs to spare, and an average of 204 eggs per hen. They leave the college in splendid condition—fit, in fact, to enter another year's ordeal. The hens are of medium size, very active, and moderate eaters.

COMPARISON OF RESULTS.

The most prominent feature of the records is a decline of 11 eggs per hen in the average production, as compared with the preceding test. Considering the great difference in the weather conditions covering the two years, it is a matter for congratulation that the disparity was not much greater. The financial results were effected by the fact that the average price of eggs was 30 per cent. less than for the previous year. As a partial set off against this, however, the cost of feeding was 24 per cent. less. The following compares the results of the three competitions:—

—	1902-3.	1903-4.	1904-5.
Number of pens...	38	70	100
Winning pen's total	1,113	1,308	1,224
Lowest pen's total	459	666	532
Highest total for a month	137	160	154
Average laying per hen	130	163	152
Greatest value of eggs	£7/0/3	£7/10/4	£5/13/10
Average price of eggs	1/1	1/3¾	1/
Average value of eggs per hen ...	15/6	17/9½	12/9
Cost of feed per hen	6/	5/9¾	4/5½
Profit over feed per hen	9/6	11/11¾	8/3½

A comparison of the average number of eggs from a pen each month of the three competitions is afforded by the following:—

Month.	First.	Second.	Third.
April	18 4	18·3	23·8
May	26·5	44·6	33·8
June	40·0	69·0	49·0
July	68·6	94·6	77·8
August	97·3	122·2	104·2
September	106·3	121·8	102·1
October	97·7	111·9	108·2
November	84·5	94·4	102·6
December	77·4	89·2	94·1
January	78·7	82·9	77·6
February	46·6	72·9	72·3
March	51·0	57·9	65·6

A comparison of the average egg production and the average value of the eggs per hen of the various breeds is instructive and interesting. As a guide, however, to the relative merits of the different breeds, no significance can be attached to the positions occupied by varieties in which there were only one or two pens competing. The following are the analyses:—

Breed.	Per hen, Eggs.	Per hen, Value.
6 Rosecomb Brown Leghorns	178·50	16/6
6 Rhode Island Reds	176·00	14/9
96 White Leghorns	166·23	13/7
12 Black Hamburgs	163·83	13/9
6 Anconas	163·66	12/10
12 Rosecomb White Leghorns	163·33	14/6
108 Black Orpingtons	159·48	13/8
6 Imperials	158·16	14/9
12 Buff Wyandottes	155·25	14/8
18 Brown Leghorns	154·77	11/9
18 Golden Wyandottes	151·55	13/2
36 White Wyandottes	151·02	12/9
18 Buff Leghorns	147·77	12/9
108 Silver Wyandottes	145·30	12/3
60 Buff Orpingtons	142·95	12/4
6 Andalusians	142·00	10/10
6 Jubilee Orpingtons	141·33	12/2
6 Pile Leghorns	140·50	12/4
24 Minorcas	133·38	10/4
18 Langshans	131·88	10/
6 White Rocks	124·00	11/
12 Partridge Wyandottes	107·00	8/6

MR. THOMPSON'S REVIEW.

"That these competitions are doing a vast amount of good in a variety of ways," reports Mr. Thompson, "is beyond cavil. One direction is in the advancement of early breeding. This does not mean, as some people think, breeding out of season, viz., in April, May, or even June, but simply breeding in season, catching the early spring, and hatching out the great bulk of the stock in early August. How many breeders before these competitions started were breeding in early August, or had the bulk of their stock hatched before the end of September, or even into October, November, and December? Very few would be the reply, and this was proved by the fowls competing in the first egg-laying competition, as pretty well the whole of the competing hens were bred out of season, having been hatched either in April and May, or in November and December. Now there is no difficulty in filling the whole 100 pens with August-bred birds, or, at the latest, September. Who will say that is no gain?

"The whole of the 600 hens entered the test in good health and condition, although a few of them were not quite true to feather of the breeds they represented. Still, even in that way there was a great improvement, and to touch on the next competition, we are pleased to be able to say that in type and colour there is a striking improvement in the pullets that have been sent to us.

THE AMERICAN PENS.

"Six of the seven pens constituting the contingent from America, arrived at the college on December 16. The whole of the pullets were received in very good health; but we have concluded, from observation, that the pullets arrived too young; that is to say, that the shipment of pullets from a winter to a summer zone is not advisable. The extreme change before the pullets had reached maturity played very heavily upon them, and it was only with very great care and attention that we got a large percentage of them through the unseasonable moult, and that we were able to pen six of each in good condition. This gave us a demonstration of data of some value, that the older fixed varieties had the greatest stamina, and came through the trying time with the least loss.

THE WEATHER CONDITIONS.

"From the start to the finish, the weather conditions were variable to an extraordinary extent. From 24deg. to 115deg. are extremes of temperature—24deg. we experienced in June, and 115deg. in January. The weather during the first six months was wet, cold, bleak, and damp, which conditions were entirely adverse to successful egg production. For the first six months the rainfall totalled over 17in., and when it was not actually raining the ground was sodden and damp, making the whole atmosphere chilly and cold, with very little sunshine for the whole period. A very large percentage of the hens broke into moult, evidently through the extraordinary weather conditions. June was the coldest month on record since the establishment of the college, and July the wettest month on record, no less than 11in. of rain falling, and extending over a period of 19 days. This downfall flooded most of the pens, and the ground being sodden with previous rains, it was some weeks before it became thoroughly dry again. As an instance of the effects of these conditions, it is only necessary to mention that on the 8th of July the daily collection of eggs was 323, and after four days' rain it fell to 177. A further illustration of the severe weather conditions in the first six months is the fact that, while we were 80 eggs per pen behind the average for the first six months of the previous competition, we are nine eggs ahead for the last six months, compared with the last half of the second competition.

THE SYSTEM OF FEEDING.

"The birds were fed at regular hours, viz.: 7 a.m., mash; 10 a.m., green food (more or less, according to the condition of the grass in the pens), meat (*i.e.*, cut-up boiled liver) at 3 p.m., twice a week; and grain at 4·30 p.m. The mash was composed of pollard and bran; about three-quarters pollard to one-quarter bran, more or less, according to the quality of the pollard, and mixed up with hot soup twice a week, and other days with hot water in the winter months and cold water in the summer. The green food consisted of finely chaffed rape and lucerne, both splendid foods. The rape is the better alterative, while lucerne is the higher in food value, so that the merits of the two green foods lie in different results. This year the grain ration was composed of three parts wheat to one part maize, compared with three parts maize to one part wheat last year; and while we have no wish to put the shortage of eggs compared with last year down to wheat-feeding, we have no hesitation in saying that if we had fed more largely on maize we would have had at least equal results, or even better. Shell grit and fresh clean water were always before the hens.

MARKETING THE EGGS.

"The eggs were marketed in ordinary patent egg-cases, holding 36 dozen, packed into cardboard fillers. The eggs were packed clean, without washing, the dirty ones being laid aside, also any that were too large for the square space, or any that were too small. This is a simple and satisfactory way of grading. The eggs, when sent to market, always commanded the highest rate, and often 1d. above it, so that it was no assumed price on which the value of the eggs produced was based.

MORTALITY AND DISEASE.

"During the currency of the competition 53, or 9 per cent. of the hens died. This included 14 deaths from the heat wave of December last, when the maximum reached 115 degrees in the shade. It speaks well for the health of the stock from the breeders' yards when we are able to chronicle the fact that the whole of these deaths were from an ovarian cause, by excessive laying, with the exception of about four cases, which were from hereditary complaints—viz., abscess of the anus. No contagious or infectious disease was discovered among the 600 hens throughout the whole trying season of extremes of cold, wet, and heat.

THE FINANCIAL ASPECT.

"The prices of foodstuffs were much lower than last year, and there was not so much fluctuation. The prices charged to us under contract, right throughout the currency of the competition were 8¾d. per bushel for bran and 9½d. per bushel for pollard. Our average price for wheat was 3s. 4d. and for maize 2s. 6d. per bushel. The cost of feeding the 600 hens for the 12 months was as follows: Wheat £47 1s., maize £12 17s. 10d., pollard and bran £44 2s. 1d., meat £20, green food £7 10s., shell grit £2 10s., total £134 0s. 11d.

"The monthly laying was: April, 2,383; May, 3,388; June, 4,900; July, 7,782; August, 10,423; September, 10,216; October, 10,829; November, 10,286; December, 9,409; January, 7,769; February, 7,236; March, 6,565; grand total, 91,169 eggs, or 7,597 dozen.

"The monthly range of prices for eggs was: April, 1s. 9d. to 2s. 1d.; May, 1s. 11d.; June, 1s. 10d. to 1s. 3d.; July, 1s. 4d. to 11½d.; August, 11d. to 8d.; September, 8½d. to 7d.; October, 7d. to 7½d.; November, 8d. to 11d.; December, 10d. to 1s.; January, 1s. to 1s. 3d.; February, 1s. 3d. to 1s. 4d.; March, 1s. 6d.

"The market value of the eggs was £382 12s. 7d., from which deduct the cost of feed, £134 0s. 11d., and a profit of £248 11s. 8d. is left on the 600 hens. Every pen showed a profit on the cost of feeding, the pen returning the smallest value leaving a margin of 14s."

THE RECORDS.

The appended table gives full details of the laying and the value of eggs from each pen of six hens. The value has been calculated on the basis of the prices obtained for best new-laid eggs at the auction sales in Sydney each Friday. The age given is the average of the six birds at the commencement of the competition.

Details of the laying and value of eggs from each pen.

Owner, Address, and Breed.	Age (months.)	Eggs Laid.													Weight per doz. (oz.)	Market Value.
		April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Totals.		
G. Howell, Wentworthville: Silver Wyandottes ...	7¾	86	76	107	93	102	110	102	132	110	122	111	73	1224	24	113/10
J. Lowe, Wentworthville: White Leghorns ...	7½	36	51	78	97	119	122	134	135	143	125	93	60	1193	26½	101/9
J. M. Anderson, America: R.C. White Leghorns...	12	32	67	81	111	113	110	125	123	118	108	104	87	1179	23½	113/10
F. J. Brierley, Carlingford: White Leghorns ...	7½	49	54	31	83	136	130	154	153	144	116	66	55	1171	24½	97/2
Mrs. E. Scaysbrook, Gosford: Black Orpingtons ...	7	59	95	74	106	141	120	108	112	93	88	82	77	1155	25	104/2
S. Ellis, Botany: White Leghorus	8	18	52	46	58	135	119	133	131	126	110	100	87	1120	28	93/
V. J. Zahel, Marsfield: White Leghorns	8¼	...	...	16	115	108	106	134	151	147	125	100	105	1116	23½	89/1
A. J. Byrne, Eastern Creek: White Leghorns ...	7½	70	33	20	124	119	121	129	124	120	98	73	72	1103	26	94/1
Oceanside P. Farm, America: White Wyandottes	10½	31	66	73	82	123	122	124	113	111	84	84	88	1101	25	95/3
W. H. Peters, Waratah: Golden Wyandottes ...	9½	57	77	113	114	121	112	114	93	83	69	69	74	1095	23	100/3
J. Potts, Wingham: White Leghorns	7	32	91	30	67	109	124	142	147	128	103	74	44	1091	25½	92/4
Mrs. J. J. Roche, Bayview: White Leghorns ...	7	22	34	59	66	95	111	131	138	124	110	110	91	1091	28	92/4
Royle Poultry Farm, St. Leonards: Black Orpingtons	7½	51	88	72	82	123	105	111	93	113	92	74	75	1079	26½	97/4
C. Bridekirk, Enfield: Black Orpingtons	7	11	65	104	78	110	115	124	113	107	100	75	76	1078	27	91/10
F. J. Powney, Dulwich Hill: Brown Leghorns ...	8	...	11	59	91	122	128	148	130	121	106	89	69	1074	25	85/
Mrs. A. H. Hansel, America: R.C. Brown Leghorns	10	87	113	62	84	105	116	128	103	96	83	54	43	1071	23	99/3
W. Cook, Balmain: Black Orpingtons	7	1	45	96	100	91	102	121	117	103	94	79	118	1067	28	92/1
Dr. J. Martin, America: Rhode Island Reds ...	9¼	74	96	66	56	116	101	106	104	82	73	93	89	1056	25½	88/7
W. Wild, Lake Albert: Black Orpingtons... ...	7½	67	1	63	90	98	104	138	120	111	85	92	80	1049	28	91/1
A. Wedlech, Caulfield (Vic.), Black Orpingtons ...	8½	38	43	35	96	112	101	108	114	117	83	105	93	1045	26	90/8
B. T. Forrest, Sutherland: Black Orpingtons ...	7½	...	72	93	100	126	105	120	110	90	85	57	80	1038	23	89/5
D. J. Stephens, Pitt Town: Silver Wyandottes ...	7½	76	42	84	87	103	108	113	89	107	71	82	75	1037	23	93/7
Horwood and Dennis, Wagga: White Wyandottes	7½	62	55	44	112	121	108	111	90	93	82	69	88	1035	23	93/4

F. R. Small, Richmond: White Leghorns	7	24	44	29	77	111	97	124	135	125	113	85	69	1033	26	86/6
J. Stewart, Berowra: White Leghorns	8	3	...	25	106	116	111	114	131	127	103	102	89	1027	24½	80/3
A. Arnold, Ashfield: White Leghorns	7½	35	11	9	68	118	128	141	135	132	127	73	47	1024	27½	79/11
Ventura Poultry Farm, Miranda: Silver Wyandottes	7½	43	44	91	86	111	107	114	87	97	87	74	81	1021	24	90/6
J. W. Woodland, Penrith: Black Hamburgs ...	7	4	25	50	91	125	108	113	118	106	82	82	89	994	22	81/5
C. H. Wickham, Roseville: Black Orpingtons ...	7½	50	67	93	83	110	87	94	86	84	81	78	75	988	23	90/9
C. Chapman, Elderslie: White Leghorns	9	22	11	48	113	125	102	114	118	85	95	75	78	986	26	81/5
H. Pannell, Christchurch (N.Z.): Buff Orpingtons	6¾	25	13	58	119	112	107	115	107	92	78	79	79	984	25½	82/7
W. H. Tombs, Springwood: Anconas	8	56	68	72	87	91	89	102	114	104	76	77	46	982	26½	79/3
E. Solomon, Waratah: Buff Leghorns	7½	28	81	76	99	107	90	103	88	76	74	74	77	973	24	87/10
Ponton and Son, Tuggerah, Langshans	7	...	...	43	117	95	121	118	117	100	104	65	100	980	26	79/
Bonaventure P. Farm, Mt. Druitt: Black Hamburgs	7	2	...	...	24	102	117	141	144	134	114	114	80	972	25	74/1
J. D. Callaghan, Concord: Buff Orpingtons ...	7½	27	54	55	104	114	84	100	78	95	78	89	85	963	26	84/
C. A. W. Weil, Ashfield: White Leghorns ...	7	64	71	18	71	113	125	125	110	93	63	52	55	960	28	82/10
Mrs. N. Kirby, Ryde: Buff Wyandottes	8	38	82	72	90	101	103	105	85	85	86	47	63	957	26½	93/4
Veness and Fox, Ashfield: Silver Wyandottes ...	9	63	68	61	83	105	94	80	88	69	87	78	84	960	25½	88/10
J. B. Smith, Parramatta: Silver Wyandottes ...	7½	...	...	75	125	110	89	100	103	98	80	87	88	955	23½	79/3
W. E. Boutcher, Canterbury: Imperials	8	...	13	110	83	101	96	113	104	98	86	70	75	949	25½	88/6
L. L. Ramsay, Carlingford: Black Orpingtons ...	9	12	23	48	111	131	94	111	105	92	72	83	49	931	27½	75/11
F. Greenwell, Mittagong: Pile Leghorns	8	32	61	73	74	94	98	92	82	61	65	66	45	843	25	73/11
H. E. Kelly, Ashfield: Black Orpingtons	7	...	...	80	92	123	109	96	77	94	78	111	72	932	26	75/10
Dr. Fiaschi, Sackville: Brown Leghorns	7	21	20	23	50	92	111	107	120	124	78	98	80	924	24	64/5
G. Bernauer, Auburn: Buff Orpingtons	9½	2	35	79	87	110	98	96	92	88	90	64	80	921	23	77/9
M. Ward, Gosford: Black Orpingtons	9	37	31	52	69	113	109	110	103	101	58	54	82	919	25	77/11
S. Kendall, Kiama: White Wyandottes	7½	...	...	15	57	122	118	124	116	102	100	76	83	913	25	68/10
Mrs. E. Battey, Richmond Buff Wyandottes ..	7½	68	63	52	79	87	82	98	90	77	78	81	51	906	28	83/2
J. Howe, Annandale: Black Orpingtons	7	7	28	42	38	102	126	119	116	102	85	71	64	900	26	71/8
W. and F. Ottery, Campbelltown: Buff Orpingtons	8	23	72	68	87	110	93	103	87	67	56	68	65	899	25½	79/4
J. F. Scobie, New Lambton: Silver Wyandottes...	8	...	0	34	113	120	103	93	93	91	85	79	87	898	26½	71/9
E. W. Lee, Kiama: Black Orpingtons	8	...	15	57	74	63	112	120	120	94	87	82	73	897	25½	73/4
A. Munro, Rockdale: Buff Leghorns	7	...	12	64	80	118	107	119	100	103	43	80	70	896	23	71/9
Miss E. Wright, Merrylands: Buff Orpingtons ...	8	23	38	74	85	100	90	74	84	92	78	71	73	891	25½	77/10

Details of the laying and value of eggs from each pen—continued.

Owner, Address, and Breed.	Age (months).	Eggs Laid.													Weight per doz. (oz.)	Market Value.
		April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	Totals.		
H. A. Jones, Thornleigh: Black Orpingtons ...	9½	15	19	66	70	97	95	97	88	97	84	68	83	879	27	74/3
J. Gamble, Ashfield: Buff Orpingtons	10¼	111	70	38	50	101	92	81	66	60	62	63	76	870	24½	83/
Mrs. C. Burke, Narumburn: Silver Wyandottes ...	10	16	33	66	85	98	93	93	79	84	69	80	73	869	25	73/11
H. H. Bassan, Tenterfield: Silver Wyandottes ...	8	8	23	57	78	86	117	109	89	93	70	79	60	869	25	68/11
E. Waldron, Willoughby: Black Orpingtons ...	7	13	25	49	89	121	91	107	114	63	78	73	37	860	25½	68/5
C. H. Bayley, Croydon: Buff Orpingtons	8	23	21	72	77	113	104	84	89	80	64	68	64	859	23½	71/3
W. F. Evenden, Croydon, Andalusians	7¼	2	18	12	38	99	122	133	114	115	58	79	62	852	28	65/4
W. Gibson, Penrith: Jubilee Orpingtons	8	35	48	56	54	106	83	96	90	90	73	54	63	848	25	73/4
G. W. Commins, Wagga: Silver Wyandottes ...	10	15	3	35	83	106	117	114	83	75	64	69	82	846	25	67/5
E. Traherne, Christchurch (N.Z.): Minorcas ..	7	23	5	4	69	108	107	113	113	88	73	84	57	844	28½	66/3
S. B. Kennard, Toowoomba (Q.): Golden Wyandottes	9	45	40	57	82	98	85	93	75	75	60	53	76	839	25½	74/4
A. E. Henry, Ryde: Silver Wyandottes	9	8	23	37	77	109	80	95	102	87	48	85	86	837	24	70/
D. Stearn, Darlinghurst: Black Orpingtons ...	7	22	7	36	116	128	82	96	93	99	54	65	35	833	26½	67/3
H. Donnan, Bexley: Silver Wyandottes	8	60	28	50	74	93	81	85	74	90	56	71	71	833	26	75/1
L. Hunter, Penrith: Buff Orpingtons	7½	...	35	75	69	105	79	102	91	80	62	76	55	829	22½	69/4
Mrs. J. M. Allen, Rockdale: White Wyandottes ...	8	32	51	46	54	92	87	105	81	73	70	73	63	827	23	72/2
W. A. Hunter, Kiama: Silver Wyandottes ...	8	10	...	23	114	89	90	81	99	90	85	69	75	825	26	67/3
Arcadia P. Farm, Arcadia: White Wyandottes ...	7½	51	38	45	73	104	93	91	73	65	58	50	68	809	23	70/8
W. E. Cates, St. Ives: Black Orpingtons	7¾	4	112	42	87	83	109	106	110	88	70	51	40	808	25	63/10
A. Wood, Quirindi: Minorcas	7	...	19	47	43	85	108	84	106	120	103	62	75	802	29½	62/10
Miss N. A. Pratt, Smithfield: Silver Wyandottes	10	45	55	64	85	92	82	103	73	62	49	50	41	801	26½	70/5
C. Bowditch, Reefton: White Leghorns	8	3	1	3	24	89	95	124	125	95	97	89	53	798	30	60/2
H. S. Bignell, Bandon Grove: Golden Wyandottes	7¼	...	16	21	62	107	113	101	90	70	61	81	74	796	24½	62/7

H. Devine, Ashfield: Buff Leghorns	7	8	61	74	58	82	76	83	99	75	79	54	42	701	25	69/70
E. G. Wyckoff, America: Silver-pencilled Wyandottes	10½	27	27	44	60	86	105	87	100	82	48	62	61	789	23	60/3
J. Ahern, Arncliffe: Brown Leghorns	7	15	27	23	44	94	99	102	94	110	80	58	42	788	26½	63/2
Grantham P. Farm, Plumpton: R.C. W. Leghorns	8	7	33	25	41	87	118	118	110	94	61	52	35	781	26	60/11
D. B. Bannister, Pymble: Minorcas	7	7	7	4	60	56	110	120	123	106	95	67	25	780	29	58/3
W. Turner, Croydon: Minorcas	7	...	5	5	45	54	108	105	113	111	88	75	71	780	31	61/
Guan Bros., Inverell: Silver Wyandottes... ...	7½	...	...	39	84	98	85	103	96	81	72	67	52	777	26	51/2
D. T. Roots, America: White Rocks	10½	26	37	61	75	83	98	108	94	50	47	40	56	775	23½	66/1
G. Webster, Mullengandra: Black Orpingtons ...	8	...	11	25	102	103	100	100	83	68	70	51	53	766	27½	60/3
E. H. Maxwell, East-hills: Buff Orpingtons ...	7½	23	16	79	68	108	89	91	76	67	42	50	49	758	28	63/9
A. Baxter, Sans Souci: White Leghorns	7	3	23	35	59	92	111	115	120	88	51	38	18	753	27½	56/3
J. Harley, Balmain: White Wyandottes	7¼	...	26	58	84	103	96	89	80	65	50	55	46	752	24	60/10
G. Craft, Ingleburn: Partridge Wyandottes ...	9½	11	...	55	61	115	94	103	75	58	42	17	61	752	24	62/5
F. Lewis, Blayney: Silver Wyandottes	7¼	16	30	43	55	95	104	79	87	68	59	66	48	750	24½	61/10
H. van Dreser, America: White Leghorns ...	11¾	27	14	...	40	81	81	96	121	104	63	69	54	750	27½	60/9
R. H. Wynne, Ashfield: White Leghorns	7½	...	9	8	66	113	106	128	117	106	37	35	7	732	30	52/10
G. L. Saunders, Randwick: Silver Wyandottes ...	7	1	36	42	84	101	73	85	70	75	54	50	50	721	26	60/
W. Wilson, Wagga: Buff Orpingtons	8	3	...	...	30	117	101	96	93	91	66	55	51	703	25	51/
D. Hogan, Islington: Langshans	7¼	...	...	13	25	97	111	99	88	80	69	68	54	702	27½	51/11
Mrs. Thompson, Canley Vale: Langshans ...	9½	...	...	...	15	85	93	126	99	85	75	80	34	692	27	50/1
C. Davis, Blayney: Silver Wyandottes	8	...	3	9	95	96	75	87	72	69	50	64	52	681	22	52/11
W. Harris, Woy Woy: Partridge Wyandottes ...	7½	...	1	9	64	59	86	79	73	62	29	37	33	532	24	40/2

WONDER-WORK IN SCIENCE.

CREATING NEW FORMS OF PLANT LIFE.

THE FACTS AND THEIR CAUSES.

LUTHER BURBANK'S TRANSFORMATIONS.

In the "Century Magazine," Mr. W. S. Harwood gives a further instalment of his "account of Luther Burbank's unique work in creating new forms of plant life." Mr. Harwood writes as follows:—

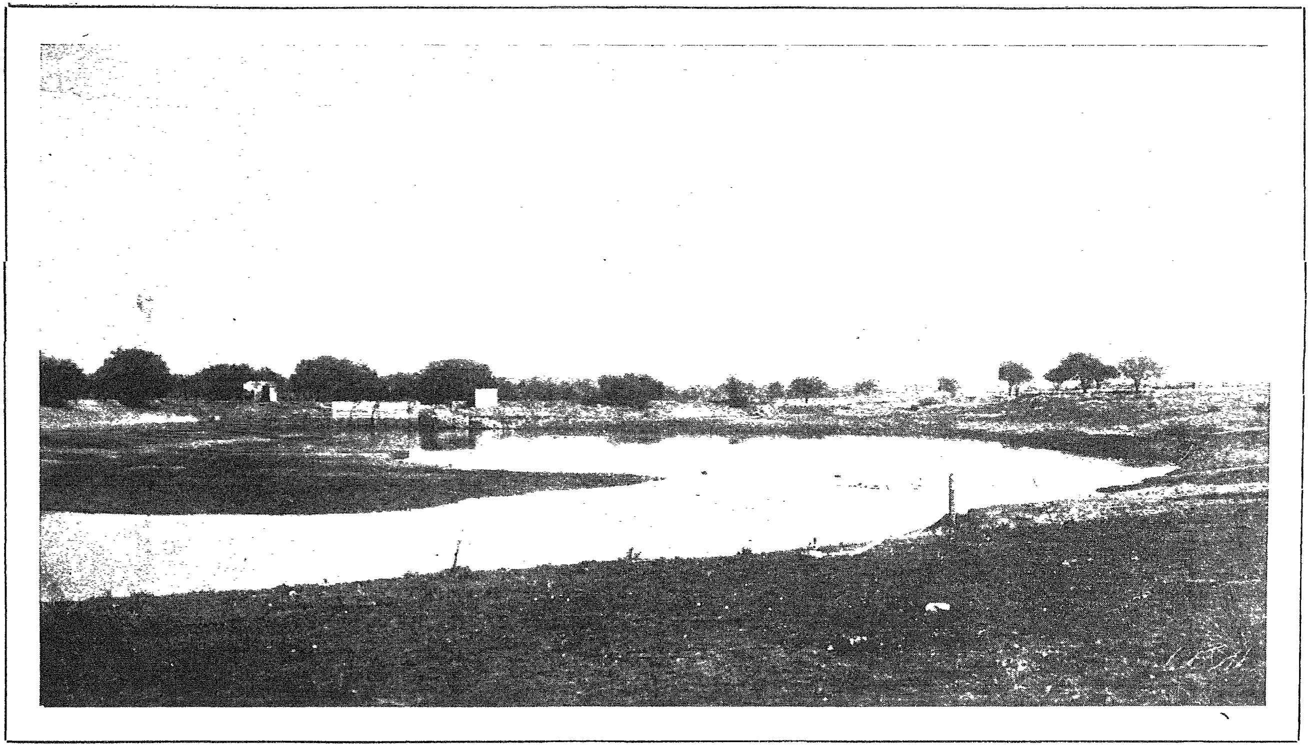
CHANGES IN FLOWERS.

"One summer evening, some years ago, as Mr. Burbank was walking through his experimental grounds, past a bank of verbenas—a scentless variety which he was breeding up into a finer variety—he was attracted by a faint, sweet odor from the bed. Bending over the flowers, he tried to locate it, but was unable. A year later, as he passed beside the bed of verbenas—now somewhat advanced in development—he was again attracted by the scent—a delicate hint of the odour of the trailing *arbutus*.

With his characteristic patience he went over the plants one by one until, at last, he found the one that had the elusive odor. It was at once isolated, and its seeds were saved and planted with great care. Succeeding sets of seeds were planted year by year, and year by year, the plants were challenged for any increase in fragrance. Such as persisted in the odor were in turn chosen for future testing, and the others discarded. The scent became more and more pronounced, continuing in its likeness to the *arbutus*, and becoming, at last, greatly intensified. To-day, the bloom itself having been much improved, the fragrance, still identical with that of the *arbutus* and double its strength, has been established.

It was so wonderful a thing that I asked Mr. Burbank if it would not be possible to breed flowers for the manufacture of perfumery, intensifying old odors so as to render the flowers richer in scent, and creating new odors by combinations of various plants, as well as placing fragrance in flowers now odorless.

He answered promptly, that it was an easy matter, and perfectly feasible. Given a flower, with a weak but desirable fragrance, it was only a question of pains, thought, time, and careful selection to heighten its odor and make it commercially valuable for the manufacture of perfume. The intensification of the perfume is shown in the case of the verbena; the complete changing of the odor in the dahlia, a flower with an offensive odor, but now com-



THROSSELL.

Irrigation Tank on Mrs. Maud Dempster's farm, at end of season. (Tank constructed by E. V. Keane).

pletely changed by Mr. Burbank, until it has the rich fragrance of the magnolia blossom.

This led me to speak of another strange possibility in floral life, I had heard he had been on the way to a blue rose.

"A blue rose?" he replied. "Why, certainly. Why not? You can have any colour you wish. I have not had time to make a blue rose, but I have seen enough in the development of the colouring of this flower to know that it is a very simple matter. If I ever get the time I may do it; but when so many things of more value press in on one, how can he stop to make it. I have, however, made a blue poppy, which you would perhaps consider quite as wonderful?"

Mr. Burbank has taught nature a new and beautiful lesson—how to grow her *gladioli* so that they will blossom around the entire stem, and not on one side in the top-heavy, old-fashioned style she had been following. It was not the work of a day, but of years of the most careful training, thus teaching a plant to change its mode of life. To make so fine a flower double its blooms and distribute them on all sides of the stem adds a new and beautiful note to the harmony of nature. For many years Mr. Burbank worked upon the daisy, taking the tiny field-daisy, the pest of many farmers, as a basis of his experiments, and developing it until it is now a splendid blossom from five to seven inches in diameter, with wonderful keeping qualities after cutting. In the same way he has greatly increased the geranium in size, and at the same time has made it far more brilliant in colour.

In whatever direction Mr. Burbank has turned his attention, the flowers have responded with increased grace, size, and fragrance, more beautiful colours, and greater virility. He has made the little *amaryllis* grow on and on in scarlet splendor until it is a full 10 inches across: he has bred more than 10,000 hybrid lilies, some of them assuming strangely beautiful forms; he has brought a *calla* up to nearly a foot in diameter, and bred it down until it was less than an inch and a-half across its perfect bloom, adding at the same time fragrance, while some of the *callas* have taken to themselves peculiar and most unusual shapes; he has taken the dainty little blue onion-flower, the *Brodiœa terrestris*, that comes in the early spring in California—a native beauty—and changed its deep azure blue to a glistening crystal-white; he has added new touches of beauty to the rose, and has taught it lessons in thrift; he has made the violets blossom in a profusion that they had never before shown, and made the yellow poppy a gem among flowers. Along with such acts as these, he has conducted hundreds of floral experiments in the way of introducing and acclimatising flowers from out-of-the-way corners of the earth.

Much attention has been paid to the improvement of the wild flowers and those tame ones, that stand low in the scale. The sedum, of the "live-for-ever" type of plants, once, a most ordinary flower, has been advanced by breeding, to a point of beauty. It occurred to Mr. Burbank one day that it would be interesting to change the pampas-grass, with its decorative plumes, from white to pink; so, after long experimentation and training, the change was wrought, the effect being very striking.

CHANGES IN FRUITS.

From Siberia, Australasia, India, or Africa, devoted friends, ever on the alert, send Mr. Burbank new and strange plants, that he may make them into more beautiful and useful forms of life. One day an agent in Japan sent some plum pits coming from a tree not specially remarkable, but from which he thought Mr. Burbank might develop a higher order. After several years had elapsed in growing the plum, one of the trees was chosen for further treatment, it early showed that it had a marvellous reproductive power, and three or four years ago, in a large orchard planted from its cuttings, 22,000 plums were stripped from a single tree, in order that the tree might have a chance to mature its normal number of plums. The greatest obstacle in the way of this plum—one of the most famous that Mr. Burbank has produced, and bearing his name—is that it is so marvellously productive. It requires many hired "strippers" each year to go through an average-sized orchard to strip the branches of the green plums, in order that the trees may not overbear.

The beach-plum, a small, bitter, wild fruit, has been transformed into a large delicious fruit, the tree bearing so abundantly that the foliage is sometimes almost wholly displaced by the fruit.

In his researches into plum life, Mr. Burbank had tried to combine a plum and an almond, to see what the result would be. Interesting as it was, from a spectacular point of view, it was not of sufficient importance to warrant further development: but the study led to the consideration of the crossing of two other species, an apricot and a plum.

A common wild American plum, a Japanese plum, and an apricot formed the basis of the experiment, and in course of time that which scientific men had said was an impossibility—the making of a new fruit—lay before him accomplished. Nothing stranger has ever been done by him. The apricot form and colour persist in the outside of the new fruit, but the flesh may be crimson, yellow, pink, or pure white. The pits are sometimes those of the apricot, and sometimes those of the plum. Because in the tree itself, there are certain imperfections not yet overcome, the fruit has not been given to the world, other work upon it being still under way. The flavour of the plumcot, which is the name of the combination, is pronounced by some, superior to that of any similar fruit, and absolutely unlike anything ever before tasted.

Strange faculties or properties are given to some of these plums upon which Mr. Burbank has worked. One of them has no pit at all. The pit, after long years of breeding, having been driven out of it. Another has a delightful fragrance, so powerful, that when a single plum is left over night in a room, the whole apartment is saturated with the perfume the next morning. One day, at Santa Rosa, Mr. Burbank blindfolded one of the best-known fruit-merchants in the world—an expert, too, in all lines of the earth's fruits—a fruit was handed him to eat, and he was asked to name it.

Enthusiastically he replied, after the first bite: "That's the most delicious Bartlett pear I ever put tooth into."

With sight restored, he found that he had been eating a plum, with not a hint or a trace of the pear in all its ancestry. A vague pear-flavour had been discovered years before in one of its forebears. This flavour Mr. Burbank had nurtured and intensified with vast pains until at last he had produced this marvel, a plum having the flavour, the meat texture, and the aroma of a pear. Strangely enough, some of the typical pear-tree characteristics are noticeable in the Bartlett plum-tree, without there having been the slightest strain of pear-tree blood in its veins.

Many kinds of fruit come under Mr. Burbank's scrutiny in his endeavour to add to the food resources of the world. Years have been spent in the development of raspberries, for example, small and imperfect fruit being greatly enlarged, and not only retaining all that was good in its old flavour, but taking on new toothsomeness. So, with cherries, he has taken a small fruit, poor in quality and lean in bearing, and transformed it into a rich, palatable fruit, yielding far more abundantly than the stock whence it sprang. Hundreds of varieties of apples have been under test and are still being improved. The results reached through planting the seeds of apples are often very curious. For example, 36 apples were all grown from the seed of one apple, and yet no two of them were alike. In grafting apples, the same tree is used often, year in and year out, as many as 400 apples growing on a tree at the same time. Sometimes other fruits are grafted upon the tree, so that there may be 500 varieties of fruit growing at once from the same parent tree. Mr. Burbank is constantly on the look out for odd sorts of fruits with which to make combinations with other fruits, sometimes strengthening the old types, sometimes, as in the case of the *elaeagnus*, developing a poor and little-known fruit into one of much more importance.

Extensive experiments have been carried on in the production of nuts. Walnuts, for example, have been given much attention in order to make them larger, their shells thinner, and their meat whiter. Some criticism has been made of various injurious artificial methods of bleaching the English walnut meat to make it look more attractive. Mr. Burbank has rendered all this unnecessary by breeding a walnut with a white meat—eliminating, by years of patient labour, the tannin in the skin encasing the meat, which gives it its dark colour and bitter taste.

But let no one think that the creation of a new plum, or of any other new fruit, is a matter of a morning's stroll with grafting-knife and pollen-saucer. More than 500,000 plum trees, developed during years of patient breeding and selection, have been raised for a single test, and all but one or two of them have been put to death.

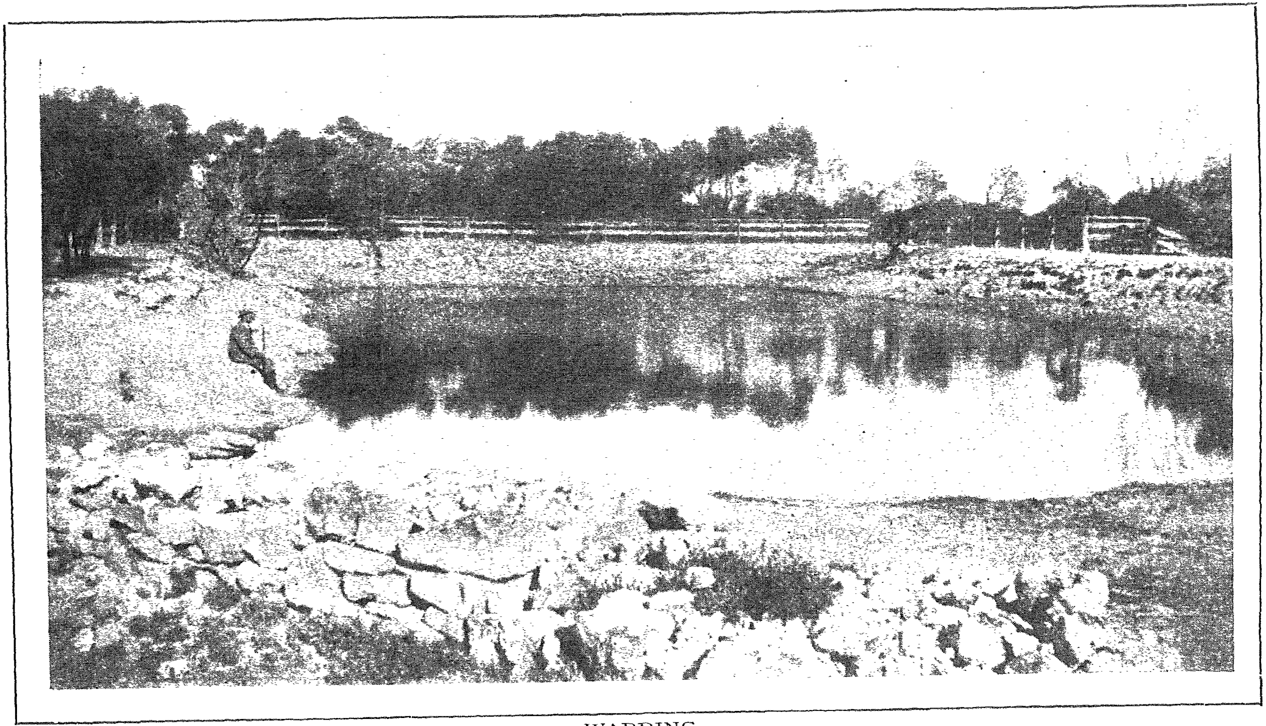
It would be but natural for any man carrying forward such extensive experiments to study, or at least to observe, some of the laws which govern, or—perhaps better said—which guide the forces of nature in the carrying out of her affairs. Still more would it be the province of a man with the intuition of Mr. Burbank to go deeper and still deeper into the inner life of nature, the more exhaustively he studied her outward manifestations. It will be well to bear in mind that in his study of the underlying principles of plant life, Mr. Burbank has not been circumscribed in any particular, but has had virtually an unlimited field of operation. He has not accepted the observations of many other people as a basis for his own conclusions.

THE MENDELIAN LAWS.

In 1865 a parish priest in Austria named Mendel, later a teacher in the Realschule at Brün, prepared a paper which set forth the results of some of his studies into plant life. He announced certain laws in regard to the crossing of plants which have since been generally accepted. These laws have been absolutely overthrown by Mr. Burbank.

Mendel's laws, put in the simplest possible form, held that where two plants were crossed, as two peas, there would be in the offspring two prevailing sets of characters or characteristics, to which he gave the name of "dominant" and "recessive." That is to say, certain prominent characters or characteristics of the parent peas would appear in the new plant—as the length of stem, colour, and shape of leaves, shape of seed, arrangement of flowers, and so on. These would be dominant characters. Certain other characters would appear in lesser number in the new plant, or would disappear altogether. These were the recessive ones. When the new plants thus formed were fertilised they produced offspring in which the two characteristics, the "dominant" and the "recessive," appeared in an invariable ratio or proportion—that of three to one. Thus seventy-five per cent. of the characteristics of the new plant—its form, colour, shape, and so on—would be dominant, and twenty-five would be recessive.

Then "Mendel" carried the subject still further, and demonstrated that the "recessive" characters bred true, but that the "dominant" ones produced progeny one-third genuine dominant, which also bred true to their own type, and two-thirds cross-breeds; the latter, when self-fertilised, giving the old ratio of seventy-five per cent. "dominant" characters and twenty-five per cent. "recessive."



WARDING.

Public Dam. (Constructed by E. V. Keane).

This law would extend, so some of its adherents maintain, throughout not only all vegetable life, but throughout all animal life as well. Hence it would be possible to determine beforehand precisely what results would follow in the crossing of two plants—that they would follow these certain and undeviating laws. It would be not only of vast interest to the race from the standpoint of evolution, but of immense economic value to all breeders of plants and animals.

It should be noted in passing that prominent scientists in Europe have recently "re-discovered" this law, notably among them being Dr. Hugo de Vries, of Amsterdam, one of the leading Botanists of the day.

In a wide variety of experiments, covering over a period of 30 years, averaging a million new plants a year upon which to work, frequently using 500,000 plants for a single test, sometimes as many as 1,000,000, and rejecting them all save perhaps two or three—having carried on over 2,500 individual investigations in as many species—Mr. Burbank has over and over again proved the utter inadequacy of the Mendelian laws. Generation following generation, not necessarily in isolated cases in the pots of the conservatory, or the confines of the cloister garden, but in the magnificent reaches of the open, where, if necessary, a million plants may be put to work on a single problem, this law has utterly failed. Mr. Burbank has used 500,000 plum trees to carry on a single test. He has had half-a-million hybrid lilies under study at the same time.

Take, merely for an instance among the many which might be brought forward, the results which have been noted in the breeding of the walnut tree. Here the laws of Mendel were absolutely disproved at every point. The new trees followed no known laws. "Dominance" and "recession" were absolutely inoperative factors. Nuts, for example, as the test proceeded, were produced like one parent, like the other but like neither, or like no other walnut ever known in the world; and they were produced with absolutely no regard whatever to ratio or proportion of parental characteristics. The leaves of the progeny took to themselves an odor, a real fragrance, unlike any ever known. In the character of the trunks, the assembling of the branches on the trees, the development of the leaves upon the stem—some of them numbering five on a stem, some 20 or 30, some 50—in the marvellous growth of the trees, the law was broken again and again.

In passing, it may be noted here that Mr. Burbank has accomplished that which Darwin hinted at, but accepted with reservations—the grafting of one tree upon another, and at the same time the tranformation of the tree without fertilisation, the accomplishment of a complete cross by the graft. He took a French plum, unknown in America, and grafted it upon a Japanese plum. The graft bore no bloom, but the tree was re-created, if you will; its seedlings took on a wholly new life, and became hybrids; its vital essence was changed through the medium of the graft.

"THE GRAND PRINCIPAL CAUSE."

Mr. Burbank determined long ago that, up to a certain point, changes could be produced in plants at will, when the conditions are ripe; while the results of selection are often so simple as to form a mechanical rule. In other cases it may be wholly impossible to follow these results. A million causes may have been at work to start a plant forward on a given course. A million shades of environment, influences may have existed, just as a million episodes in a man's life, little or great or so small as for ever to remain unnoticed, may have had their influence upon him. It may be that Omnipotence has rules or laws or forecasts bearing upon what will come to pass in a given million of plants, when they enter upon a new life; but Mr. Burbank holds that it is manifestly absurd for man to attempt to establish such laws.

Wallace, in his "Darwinism," brings prominently to the fore and elaborates Weismann's theory of heredity, the germ of which is, that acquired characteristics, of whatever kind, are not transmitted from parent to offspring. This, Mr. Burbank has disproved over and over; indeed, has established the precise opposite, that the only characteristics that can be transmitted are the acquired ones.

The reason Mr. Burbank crosses a pair of plants is to break up their old habit and form of life, and get variations. Back of these two plants, he knows, are a million tendencies, he sees heredity in a new form, it is, as he defines it, "the sum of the effects of all the environments of past generations on the responsive ever-moving life-forces; or, in other words, a record kept by the vital principle of its struggle onward and upward from simpler forms of life; not vague in any respect, but indelibly fixed by repetition. In still shorter phrase he puts it: "Heredity is the sum of all past environment." When he has crossed two plants to produce a third he illustrates what happens, in this way: here is a river, the life-forces of the plant; here is the bank, the environment. These forces, constantly pushing forward, are held in check by the bank, and yet in some measure each acts upon the other. There may be a rock in the stream which may make a ripple, turning the flow aside for an instant, but the river does not stop on its way to the sea. Yet, if you place a sufficient number of rocks with the other one, or if a new and better channel is found, the whole river is turned. But no one can tell when these rocks are to appear; no one can foretell when the stream will change its course, or how, or where.

He holds that there is in plant reproduction a vital principle which is more or less indelibly fixed by repetition. What this principle is in essence he does not know, he is concerned with its manifestation. "But we do know," he says, "that when simple cells become joined together, mutual protection is assured, and we know that they exhibit organised forces in new directions which were impossible by any of the individual cells not associated in a cell-colony with its fellows. These cell-colonies will, if environment is favourable, increase in strength while colonies less favourably situated may be crippled or destroyed. We see this natural selection in all life every day all around us."

Mr. Burbank has come to look upon the crossing of species and varieties as of paramount importance. The "survival of the fittest" and "natural selection" are interesting phrases and full of import, but he has found in the midst of his vast tests that "crossing" goes far beyond them in significance.

"It is," he says, "the grand principal cause of all the existing species and varieties of earth, sea, and air. Crossing these differing lines of heredity—differences caused by the action of past environment on the life forces—produces a vast complication of vital movements, habits, tendencies, or memories, if you prefer, some of which are fixed by ages of repetition, while others are of later acquisition; each of these, like drops of various chemicals in a pool of water, changes by so much the heredity of the subject, all being blended into the whole as we see it in its present state. Past tendencies must fade somewhat as new ones are added; and as each individual has ancestors in untold numbers, and as each is bound to the other like the numerous threads in a fabric, individuals within a species, by thus having very numerous similar lines of heredity, are very much alike, yet no two are just the same. Thus in the bundles of individuals having similar heredities, which for convenience we call species, we seldom find wide variations, and for the reasons just given. But cross two of these species, and see what results. Sharp mutations and variations will appear, but not in the first generation, as the two are bound together in a mutual compact which, when unloosed by the next and succeeding generations, will branch in every direction as the myriad different lines of heredity combine and exhibit themselves in various new directions, as if the bundles of hereditary tendencies were burst asunder by the impact, and mutually arranged themselves in new and often wholly unexpected forms."

ENVIRONMENT.

Bearing still closer upon environment, Mr. Burbank says:

"A study of animals or plants belonging to widely different species, and even *genera*, which have been under similar environment for a long time, will always show similarity in many respects in the various means they are compelled to adopt for defence in the preservation and reproduction of life. Desert plants often have thorns, acrid qualities, and reduced foliage surface, while in moist climates thorns are seldom seen and foliage is more abundant and not so often acrid or distasteful. Similar environments produce similar results on the life-forces, even with the most distantly related plants or animals. This fact alone, even though in opposition to numerous popular theories, should be proof enough—if proof were still needed—that acquired characters are transmitted; all characters which are transmitted have once been acquired. The life-forces are constantly pressing forward to obtain any space which can be occupied, and, if they find an open avenue, always make use of it as far as heredity permits."

Mr. Burbank notes other forces that influence plant life—superabundance of food, moisture, freedom from competition, struggle, hardship: he disposes of many of the mysterious things that people have read into heredity, in saying that where some apparently impossible thing happens. The plant of a white bean, for example, producing a black one, we have generally only to trace the matter back far enough to find that there was a black ancestor. Even where no such ancestor was found, the fact remains that tendencies, like threads in a web of cloth, had so long been pressing for expression that when the critical point was reached the strong tendencies, long overwhelmed by still stronger ones, came to the surface, though never by chance.

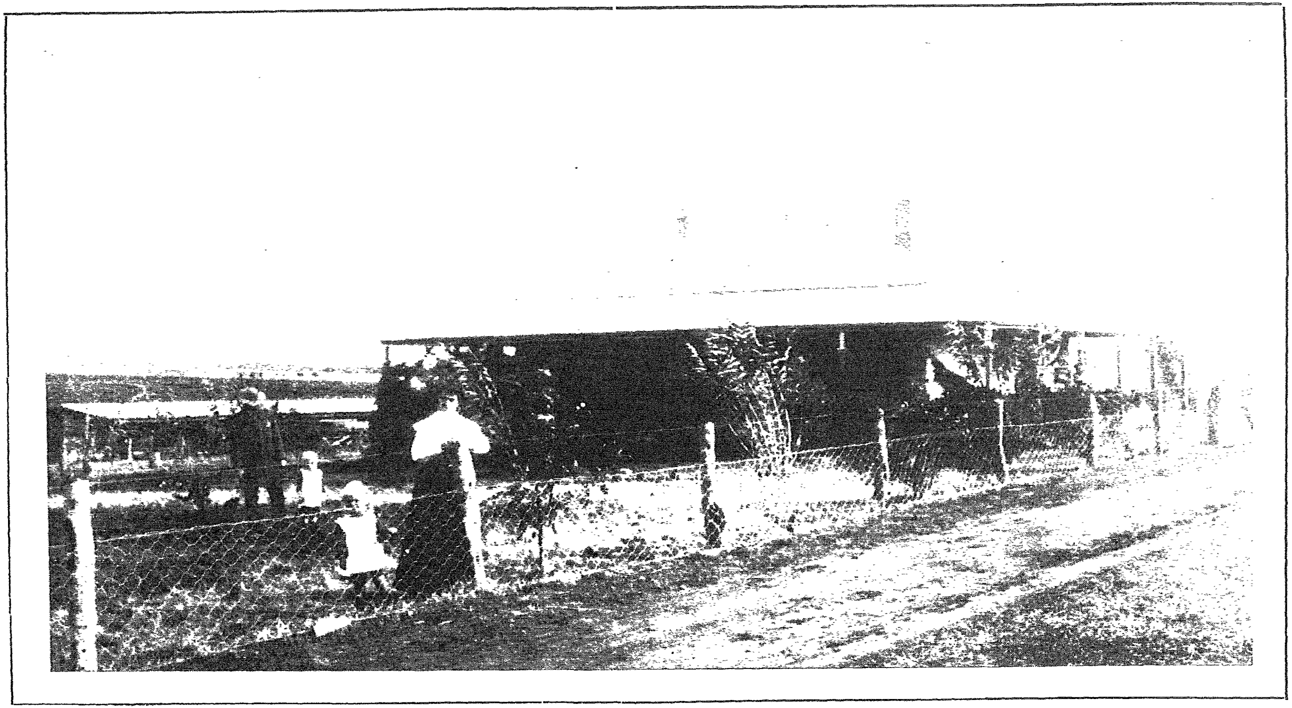
"THIS INFINITE OCEAN OF FORCE."

I asked Mr. Burbank this question:

"Has anything developed in your life]work, and in your study of the great elemental forces of nature, to imperil true faith or render dead a belief in God or the Immortality of the Soul?"

He answered:

"My theory of the laws and underlying principles of plant creation is, in many respects, diametrically opposed to the theories of the materialists. I am a sincere believer in a Higher Power than that of man. All my investigations have led me away from the idea of a dead, material universe, tossed about by various forces, to that of a universe which is absolutely all force, life, soul, thought, or whatever name we may choose to call it. Every atom of plant, animal, or planet life is only an aggregation of organised unit forces held in place by stronger forces, thus holding them for a time, latent, though teeming with inconceivable power. All life on our planet is, so to speak, just on the outer fringe of this infinite ocean of force. The universe is not half dead, but all alive."



THROSSELL.

F. W. ROE'S HOMESTEAD. Holding, 705 acres; cultivated, 698 acres; fencing, about 8 miles. On the land 7 years.

THE GOVERNMENT LABOUR BUREAU.

REPORT FOR MAY.

Mr. J. B. Hitchins, Acting Superintendent of Government Labour Bureau, has forwarded to the Minister for Labour the following report on the work of the Bureau for the month of April:—

PERTH.

Registration.—The total number of men who called during the month in search of work was 860. Of this number 545 were new registrations and 315 renewals, *i.e.*, men who called who had been registered during the year prior to the month of May. The trades or occupations of the 860 applicants were as follows:—Labourers 282, bushmen 65, handymen 64, handyboy 60, farm hands 57, cooks 35, carpenters 33, horse drivers 26, miners 20, hotel hands 19, gardeners 18, grooms 13, butchers 11, painters 11, blacksmiths 10, yardmen 10, clerks 9, joiners 8, engine-drivers 6, bakers, barmen, kitchenmen and stewards 5 of each, dairymen, grocers and orchardists 4 of each, caretakers, firemen, fitters, orderlies, plasterers, strikers, wheelwrights and waiters 3 of each, and 45 miscellaneous.

Engagements.—The engagements for the month numbers 272. The classification of work found was as follows: Labourers 57, bushmen 46, woodcutters 34, farm hands 25, handy men 18, handy boys 11, miners 10, fencers 6, boys for farms, cooks, carpenters, gardeners and yardmen 5 of each, dairymen 4, joiners, kitchenmen 3, horse drivers 3, carpenters (rough), grooms, hod carriers, and married couples 2 of each, 18 miscellaneous.

FREMANTLE.

Registrations.—The applicants for work numbered 260. There were 199 new registrations and 61 renewals.

Engagements.—There were 22 engagements classified as follows: Labourers 18, handy men 3, and attendants 1.

The female servants who called numbered 22. There were four engagements.

KALGOORLIE.

Registrations.—There were 196 new registrations, and 36 renewals.

Engagements.—The engagements numbered 19, classified as follows: Labourers 5, woodcutters 4, engine-drivers, handymen, and handy youths (two of each), amalgamators, ironworkers, cooks, and boilermakers (one of each).

The female servants who called numbered 31. There were four engagements.

CUE.

Returns not to hand.

WOMEN'S BRANCH, PERTH.

Registrations.—There were in connection with the women's branch, Perth, 117 new registrations and 93 renewals, the classification was as follows:—Generals 33, housemaids 26, cooks 25, laundress-charwomen 23, useful girls 22, light generals 20, housekeepers 19, waitresses 11, cook-laundresses 6, kitchenwomen 6, lady helps 6, nursemaids 3, nursery housemaids 2, house parlour maids 2, laundry housemaids 2, and barmaid 1.

Engagements.—The engagements number 100, classified as follows:—Generals 28, laundresses 20, useful girls 15, light generals 7, cooks 5, charwomen, laundry housemaids, lady helps, waitresses, cook-laundresses, and housemaids 3 of each, pantrymaids 2, house parlourmaids 2, nursemaids and housekeepers 1 of each.

GENERAL REMARKS.

The number of men who called at the central office, Perth, during the month was 860. This total is 169 in excess of the number for April, and 35 in excess of that for May last year. The engagements totalled 272, viz., 190 for country districts and 82 for town, this being 50 in excess of the number for April, and one short of that for May last year. Of the 272 engagements 241 were by private employers, which is the third highest monthly total since the Bureau was established, it being exceeded in May and August of last year by 27 and 25 respectively. Of those seeking employment at the Bureau during the month, 84 had arrived in the State during the months of April and May, of whom 53 had landed during the past month. At the women's branch, Perth, there were 117 new registrations and 92 renewals. These figures, as compared with April, show an increase of 14 registrations and 5 renewals. The engagements for the month numbered 100, being 17 more than for the previous month. At the men's branch, Kalgoorlie, 81 female domestic servants were registered for employment; this is by far the largest total reached in one month. The engagements were 4. The number of individuals (men and women) who applied for work during the month were: Perth 1,069, Fremantle 282, and Kalgoorlie 313, total 1,664. The engagements were: Perth 372, Fremantle 26, and Kalgoorlie 23, total 421.

CONCLUSIONS ON PIG FEEDING.

The following conclusions on swine feeding, as the result of a number of experiments, are given by Prof. E. E. Elliott, of the Washington Experiment Station, U.S.A. :—

(1.) Wheat appears to be the food best adapted for long-continued feeding. In each case the pigs receiving this grain maintained steadier advantage than any of the other lots.

(2.) The addition of peas or oats to a mixed ration does not show any practical advantage over wheat alone. This should not be taken as conclusive evidence against the feeding of these grains in combination.

(3.) The greater cost of peas stands in the way of their profitable use as a grain feed when combined with the grains herein noted.

(4.) The results secured from barley are in both tests disappointing. Whether fed in combination or alone, it stands at the foot of the list.

(5.) Experiment 1 shows that one bushel of wheat will produce 12·8 pounds of pork. In the second experiment only 10·8 pounds were produced from this quantity.

(6.) The mixed rations produced for the same pounds of grain eaten 12·9 pounds of pork in experiment 1 and 9·5 in experiment 2.

(7.) Barley in combination with wheat gave lower results than when alone. Sixty pounds of barley produced 9·02 and 8·1 pounds of pork respectively.

(8.) The general result in amount of food eaten is somewhat above the averages reported elsewhere, but the gain per day is above the average also.

(9.) With fatted pigs bringing 5½ to 6 cents a pound, there is a heavy profit to be made in feeding wheat. This cannot be said of barley.

(10.) To feed the animal slightly below, rather than up to the limit of its capacity, is probably the wiser plan to pursue.

(11.) Growing pigs must have sufficient exercise to enable them to maintain appetite. No extra amount of care will replace this requirement.

(12.) Experiment 2 shows that the feeding of pigs for a long period without change of rations or feeding grounds may prove decidedly unprofitable.

THE PIG BREEDING SEASON.

We will soon be confronted with the season when it becomes necessary to make preparations for the crop of spring pigs and the crop, whether it be large or small, good or bad, will depend to a very great extent upon that preparation. The breeding problem upon the farm needs and demands as much attention and preparation to make it a success as any other part of the farm work. The farmer who succeeds in growing large crops of any kind takes great pains to have his soil in the proper condition, sees to it that a good seed bed has been formed, that his seed is of a good variety, and that its germinating power is strong, plants in the proper season, gives the best of cultivation, and when the time arrives for harvesting he generally has a good crop; one that will more than repay him for all the extra trouble he has been to in growing it. Now it will work the same way in the swine breeding business. There must be the same preparation.

The first thing that must be considered is the brood sow. Have you a sufficient number for your needs that are of the correct type to prove the best of mothers? If the farmer has old sows that have been tried and not found wanting, then the start is well made, but if it becomes necessary to select young sows, then it will be best to do some studying before choosing. He who is breeding pure bred stock should follow the best type of the breed, not letting fad or fashion run off with his own good judgment. But he who breeds for pork only will need to study longest, as a great many farmers breed first to one breed, then cross on some other, then on still another, until their brood sows are composed of several different breeds with a type like none of them. He has no guide to follow in his selection, if he cares for one. Here he makes a mistake. If he does not care to breed pure breds, which would undoubtedly pay, he should select some type which suits him best and stick to it, selecting his best sows from year to year, and it will be but a short time before he will see that haphazard breeding is a mistake.

In selecting a brood sow she should have a good body, long enough to carry a good sized litter, but not extremely long, for an extremely long body means late maturity and extra feed to produce a given number of pounds of pork. She should stand on good feet and legs that will be able to carry a good sized body without danger of breaking down. Her ribs should be well sprung, giving her a good wide back. She should be well rounded at the ham, carrying a good, large one. She should have a neat, well shaped face and head, with short nose to suit her breed. After the sow has been selected, the next thing to look after is her condition. At mating time the sow must be in a good healthy condition, fat enough to look pleasing to the eye, and the fat should not be all corn fed, but put on with a ration which will leave her in the best possible health

As to the boar, it would be well if every farmer could afford to keep one for his own use, for then he could buy one that would mate well with his particular sows. However, the boar used should, if possible, be strong in the points where the sows are weak. An extreme long body should be avoided in him, as pigs from such will generally be slow to mature, and therefore expensive feeders. He should be of medium length in body, have well sprung rib, with an even back, good hams and good bone, and with the minor points of the breed type, and an individual that will, when mature, be of good size. The condition of the boar is as essential as that of the sow. He should be in a good, thriving, healthy condition. The time of service is also important.—*Australian Farm and Home.*

THE WORLD'S HOP MARKETS.

The following notes on the English and Continental hop markets appear in the *Mark Lane Express*, and may be accepted as the official report of the National Association of English Hop Growers:—

HOME NOTES.

"The Easter holiday interval has passed, business in the hop section being "nominally" resumed on Wednesday. I use this expression advisedly, because I cannot find many traces of general activity since the reopening of the factors' offices. Here and there a few inquiries have been heard of, and I have been told by one factor of a fairly important transaction having taken place; but the general tone of affairs is, I think, more correctly illustrated by the incident of a game of chess, in which I found the principal of one of our most important firms engaged when I called just after the luncheon hour of a day that should have been otherwise occupied if our anticipated revival of trade had been realised. Demand is undoubtedly absent for the moment, and this suspension is somewhat remarkable, as all agree that the recent course of events marks the present season as exceptional, and absolutely outside the experience of many years. Several theories are advanced to account for this singular and surprising condition, but the whole of them are necessarily founded upon the position held by brewers with respect to our market; and I humbly suggest that the reduced consumption of beer, consequent upon commercial and manufacturing weakness, coupled with the influence of recent religious movements, is mainly responsible for the circumstances by which the Borough is at present affected. The tendency to economise hops, and their displacement by artificial preservatives, cannot be overlooked; and it is a question that deserves serious consideration, whether the depreciation of the quality of our national beverage, thus brought about by modern methods of manufacture, is not a weighty reason why English beer, as now supplied to the working classes, is less popular than it used to be.

"The main point for hop-growers is, however, whether any substantial change in the present stagnation can be hoped for. Personally, I believe that it is only temporary. I have satisfactory evidence that all consumers are not holding the stocks they have hitherto declared, and that, as the summer progresses, they will be compelled to come forward as buyers, despite the drawbacks to their output, to which I have briefly referred. The general trade of the country is steadily improving, the wave of revival excitement is more or less exhausted, and the efforts to lower the cost of production by artificial means will certainly be discontinued if it is found that debasement of quality interferes with consumption.

"Another favourable indication is found in the fact that scarcity of supplies on the Continent, and especially in Belgium, is creating demand, not only for the reshipment of foreign produce, but also for English hops. An outward current has commenced, and is steadily increasing in volume. This movement will probably prove to be an important element in our calculations in the near future. Therefore, in reviewing the whole of the probabilities of the position, I fail to discover any reason for discouragement, and am pretty certain that holders will eventually be rewarded for their boldness and their patience by such an advance in values as will give them ample satisfaction. In the meantime current prices are steadily maintained, the sales that have taken place having been made at figures fully equal to those quoted previous to the holidays.

FOREIGN NOTES.

AMERICA.

"Our Pacific Coast competitors are evidently weary of waiting for any improvement in the market by the action of buyers, and have determined to endeavour to bring matters to a crisis by following the example of English growers in combination for mutual protection. A short time ago the Washington planters pooled the whole of the hops unsold in that State, deciding to hold them indefinitely for higher prices, and this week I have received two cables, the first informing me that a combination was then being formed in Oregon to advance the market, it being expected that 15,000 out of the remaining 19,000 bales would be withdrawn from sale until July 1, and that consequently the market was

THROSSELL.
General view, Grass Valley Homestead (Mrs. Maud Dempster).

firmer, with indications of immediate advancement, as growers were holding strongly. Confirmation of this movement is transmitted in the second message, which states that 14,000 bales of Oregons had been pooled, under agreement to hold for 30 cents. until August 1, and that the balance of unsold growers' stocks would probably be pooled under the same agreement. This is good news, not only for English, but also for Continental holders, who will share the confidence thus manifested in the future of the hop markets throughout the world. Such movements demonstrate the truth of the Belgian national motto, "L'Union fait la force," in which England thoroughly believes, expressing the same sentiment in her old-time proverb, "unity is strength." May we not hope that this community of feeling will eventually result in international arrangements, whereby the interests of our industry in all districts will be protected against the wily schemes of "bears" in each country, who, in seeking to promote their own ends, do not hesitate to misrepresent the real position in order to induce their unconscious victims to walk into the traps so cleverly laid. Of course it must be expected that buyers will put forward their utmost efforts to defeat these combinations, but I believe that the realisation by planters of their awakened power will be sufficient to enable them to hold their own in the struggle, and to bring victory into their grasp.

NUREMBERG.

"Although business in the hop market is not actually brisk, the transactions immediately preceding and succeeding the holidays have been more important than are usual at this season. The sales of the past fortnight have considerably exceeded the arrivals, therefore stocks are proportionately reduced; and if, here and there, holders may have offered some concessions for special reasons, the general tone of value is well maintained, the market as a whole remaining firm at recent quotations. The current figures forbid any but very limited export trade, the chief demand being for local consumption, which will increase as the development of the summer encourages the output of beer. The preparatory work in the Bavarian plantations is progressing, their condition being favourably reported. It is stated that the plants have wintered well, but that the present growth is somewhat in arrear, when compared with its position at the same period of last season.

BELGIUM.

"With a comparatively slow demand, values remain fairly firm in all the centres of the local hop trade. Some speculators are finding difficulty in covering their contracts without loss, and the knowledge of this position causes holders to be more or less reserved. The diminution of stocks is being keenly felt in certain quarters, inquiries being frequently sent to England as to the possibility of reshipment of Belgian hops, and the importation of English produce. Several transactions of this character have been recently completed.

"The present annual consumption of hops by Belgian breweries is estimated to average 90,000 cwt., of which about 35,000 cwt. are imported, principally from Germany. The local requirements of native growth are therefore seen to be about 55,000 cwt. per annum. The area devoted to hop culture in Belgium cannot be exactly ascertained, because the official report does not include plantations which have less than two acres. But according to the survey of 1902, the area was then approximately 5,500 acres, this having gradually diminished since 1880, when nearly 11,000 acres were occupied by this branch of agriculture."

Some Notes on the Wheat "Bobs"; its Peculiarities, Economic Value, and Origin.

By W. FARRER.

The following report on this particular variety of wheat appeared some time ago in the *Agricultural Gazette* of New South Wales, and is reproduced in the hope that the information gained in New South Wales may be of use to farmers in Western Australia:—

"The season just passed, inasmuch as in some parts of the State rust was very general and destructive, has afforded an opportunity to some of the new wheats to show what their qualities are. The one which, by common consent, has on the whole come out the best is the new variety, Bobs. On that account a few lines on its economic value, peculiarities, and weak points, as well as on the history of its origin, are likely, at the present month, to be interesting to many of the readers of the *Gazette*. Bobs has proved itself to be a satisfactory resister of rust—at any rate, of the rust which damages the grain—the harmful summer rust, *Puccinia* *graminis.* The reports which have passed through my hands, or have been sent to me, coming as they have done from all parts of the State, have established this beyond doubt. The only case in which it failed in this quality was in Queensland. In that State it had to be cut for hay at the Hermitage Farm, on account of being so badly attacked; but the report from this farm differs entirely from all the other reports I have received; and as I have reason to think it possible that the wheat grown there may not have been Bobs at all, or Bobs badly mixed with a rusty variety, and as I have not yet received the confirmatory evidence I have asked for that it was Bobs, I am holding this case in suspense. It is only right, however, that it should not be kept back. When, on the other hand, we get from the Hawkesbury College, which is situated in a notoriously rusty district, such reports as the following of its behaviour in a more than ordinarily rusty season, Bobs can very well afford this single failure.

"The following are extracts from the report of the foreman of the College Farm:—'Plot about three acres in Blacktown paddock; sown 26th May; cut for seed 3rd December. Estimated yield per acre, about 28 bushels of good plump grain; beautifully clean straw, about 4ft. 6in. high, perfectly free from rust.' Of another three acre plot he reports: 'Sown 10th July; cut for hay 18th November; yield per acre, 2 tons 6cwt. 2qrs.; beautiful sample of hay, not a speck of rust. This plot, if it had been let stand for grain, would have yielded fully 30 bushels per acre, but it had to be cut when just in flower to save it from the ravages of the cut-worm. An old identity in wheat-growing remarked that it was the prettiest piece of wheat that he had seen for the last 40 years in this district.' Such reports as these lead us to think that Bobs may be found to do for growing for the production of grain in the county of Cumberland; but it is much too soon to be able to state that such is really the case. In a few instances Bobs suffered, and in two or three pretty severely, from the virtually harmless spring rust, *Puccinia dispersa.* I saw a sample from a crop which had been badly attacked by this rust near Glen Innes, and the grains were remarkable for their plumpness and unusually large size. This and other instances which have come under my notice go to strengthen the opinion I have long held that the spring rust does little, if any, harm to the grain. Rust resistance, however, is not the only quality upon which the value of Bobs depends; nor does it derive its principal value from the excellence of its qualities in the field; for, although its straw is of good strength and of excellent quality, and when Bobs is well grown its level and attractive habit of growth make the crop of it to be a treat to a wheat-grower to view, it is for its economic qualities that I value Bobs most of all.

"The following tables show the milling qualities of Bobs as compared with Power's Fife, which is considered to be about the best of the Minnesota or Manitoba varieties, so famous for the strength of their flour.

MILLING REPORTS ON SAMPLES OF POWER'S FIFE.

Date of Milling.	Remarks.	Weight per bushel, in lb.	Ease of Milling.	Percentage of mill products.			Flour colour.	Flour strength expressed in		Percentage of dry gluten.
				Flour.	Pollard.	Bran.		Quarts water per 200lb.	lb. bread from 200lb.	
April 11, 1900 ...	Grown at Lambrigg	55·4	Easy to mill	74·0	9·0	17·0	Yellow, clear, good surface	60·0	311	15·58
		55·9	...	72 0	10·1	17·7	Dark yellow, good surface, dries dark, hardly fair (Kahlbaum)	66·0	324·5	17·30
August 15, 1902...	Do. ...	56·0	Fair to mill	72·0	15·5	12·5	Fairly good, darker than next sample	56·6	303·5	18·30
August 15, 1902...	Do. ...	54·5	do. ...	68·0	16·4	15·6	Good, darkish tinge ...	56·5	303·5	17·80
October 10, 1902		56·0	do. ...	67·8	15·2	17·0	Fairly good, rather dark ...	56·0	302	18·50
May 23, 1903 ...	... ...	54·5	do. ...	69·1	9·2	21·7	Very good	54·6	299	14·10
July 29, 1903 ...	Do. ..	54·0	do. ...	72·8	15·4	11·8	Fair, yellow, waxy surface	56·0	302	15·20
November 13, 1903	Grown at Bathurst	58·0	do ...	71·1	12·5	16·4	Good, slightly pink ...	52·6	294 5	17·30
Average	... ...	55·5	...	70·85	12·9	16·2	... ...	57·3	305	16·67

MILLING REPORTS ON SAMPLES OF BOBS AND JOHN BROWN.

Date of Milling.	Remarks.	Weight per bushel, in lb.	Ease of Milling.	Percentage of mill products.			Flour colour.	Flour strength expressed in		Percentage of dry gluten.
				Flour.	Pollard.	Bran.		Quarts water per 200lb.	lb. bread from 200 lb.	
				Bobs.						
October 13, 1899	Grown at Lambrigg	58·6	Fair to mill	73·3	7·6	19·1	Yellow, clear, good surface	62·4	316·5	14·62
April 27, 1900 ...	Do. ...	61·7	do. ...	72·5	11·2	16·3	Yellow and clear	55·6	301·5	13·53
March 12, 1902 ...	Do. ...	64·0	do. ...	68·0	5·8	26·2	Very good colour, slightly pink	56·8	304·0	9·80
February 13, 1904	Do. ...	62·0	do. ...	69·2	18·5	12·3	... ...	55·5	301·0	15·80
March 22, 1904 ...	Grown at Moonbi (in black soil)	63·5	do ...	73·5	10·5	16·0	Very good, slightly yellow	54·6	299·0	10·40
April 8, 1904 ...	Grown at Moonbi (on red soil)	63·8	do. ...	70·3	11·3	18·4	Good, bleached	51·6	292·5	7·40
Average	... ...	62·3	...	71·13	10·8	18·05	... ...	56·08	302·5	11·92
				John Brown.						
June 13, 1902 ...	Grown at Lambrigg	59·5	do. ...	72·4	12·2	14·4	Very good	57·2	305·0	14·00
March 22, 1904 ...	Wagga (main crop)	61·1	do. ...	73·2	10·2	16·6	Excellent	56·0	302·0	9·90
Average	... ...	60·8	...	72·8	11·2	16·0	... ...	56·6	303·5	12·25

"An examination of these tables will furnish many points of interest. Before I begin to compare Bobs with Power's Fife, I will point out that the examinations of Bobs include one of a sample which was grown in red soil near Moonbi. Now, it is well known amongst millers that wheats, when they are grown in the red soils of this part of the northern districts, produce much weaker flour than they do when they are grown in other parts of our interior; and it was to see to what extent this is the case that this sample was procured from Moonbi for examination. The result confirms the reputation these soils have; for it will be seen that the strength of the flour from this sample is very much lower than that of any of the other samples which were examined. It will also be seen that, although a sample from black soil at the same place produced flour of considerably greater strength, notwithstanding that more flour was won from it, than did the sample from the red soil, this flour possessed less strength than any of the samples which had been grown elsewhere. Bobs, therefore, in respect of the quality of flour-strength, has been placed at a disadvantage in this comparison. It will be seen from these tables that the average flour-strength of Bobs corresponds to 302½lb. bread from a 200lb. sack of flour, while that of Power's Fife corresponds to 305lb. I may point out here that the strength of the flour which is made from wheats of the Purple Straw class corresponds to about 281lb. In regard to the average amounts of flour (71·13 per cent. for Bobs and 70·85 per cent. for Power's Fife) yielded by these two varieties, a trifle over a quarter of a pound more was won from 100lb. grain in the case of Bobs. The same quantity of grain produced with Bobs about 2lb. less pollard and 2lb. more bran as compared with Power's Fife. It will be noticed also that while the average weight per bushel was only 55½lb. with Power's Fife, with Bobs it was nearly 62⅓lb. The difference—6¾lb.—is very great, and comes mainly from the superior suitability of Bobs for our climate, and especially from its being early enough to escape most of the hot dry winds of early summer; while Power's Fife, from being much later in ripening, usually suffers from them as well as from the other disadvantages which all late-maturing sorts have to encounter. The most striking difference, however, between Bobs and Power's Fife, and the most important, remains to be pointed out. It will be seen that the average gluten-content of the flour of these two varieties is 11·92 per cent. and 16·76 per cent. respectively—a difference of 4·84; whereas the difference in their flour-strengths, as represented by pounds of bread from a sack of flour, is only 2½ in favour of Power's Fife.*

"While the flour of Power's Fife—from being richer in gluten—undoubtedly furnishes a better balanced and stronger food than does that of Bobs, in order to get so much glutten—to get, in fact,

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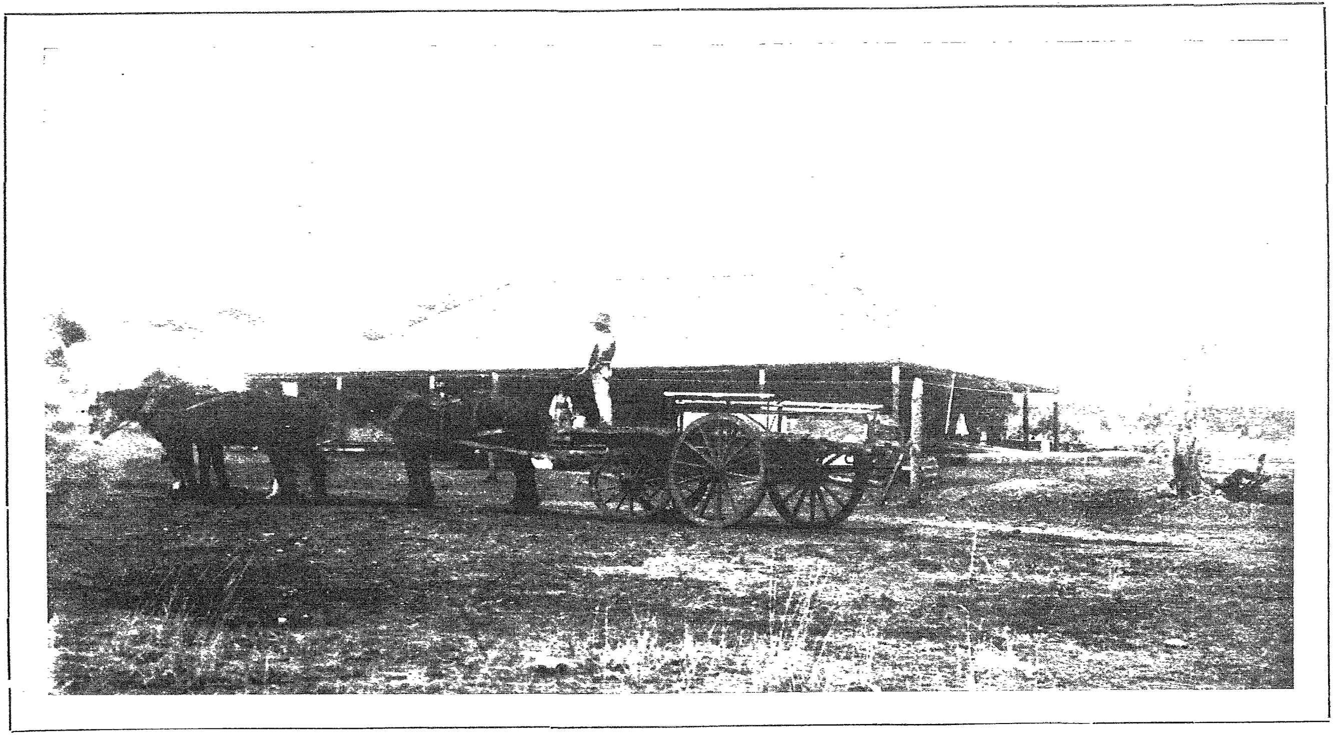
* If in calculating these averages we omit the sample of Bobs from red soil at Moonbi, which was grown under conditions which are notoriously and unusually unfavourable, the averages for this variety are 12·83 for gluten-content and 304·5 for flour strength, while they remain at 16·76 and 305 for Power's Fife. The difference is now only half a pound of bread from a sack of flour in favour of Power's Fife, while its percentage content of gluten is greater by nearly 4.



THROSSELL.

Andrew Martin's Homestead. Holding, 665 acres; cultivated, 410 acres; fencing, about 4 miles. Seven years on the land. (Started without capital).

gluten enough to produce flour of the average strength it possessed in these examinations—Power's Fife makes much greater demands on the soil for nitrogenous plant-food than does Bobs to get gluten enough to give its flour the same strength. The obstacle which, more than any other, I have from the very first feared to be in the way of my making wheats which will produce strong flour when they are grown in this country under ordinary farming conditions, has been the circumstance that, speaking generally, our soils, other than some of the virgin soils in our best districts, are poor in humus, and consequently in the organic nitrogen of which, for the same soil, the humus content is practically a measure. In the state of Minnesota, which may be regarded as the headquarters of the strong-flour wheats (the Fifes and Red Blue Stems), it has been found that, owing to the diminution of humus which has taken place in the soil, these wheats are unable to keep up the strength of their flour when they are grown in the long-farmed lands. If the old standard of strength is to be kept up in the grain which is produced from these soils, varieties will have to be grown which are like Bobs in being capable of yielding a stronger flour from a smaller content of gluten, and consequently are less exacting in their demands for nitrogenous food than are the Fifes and Red Blue stems, which are essentially the varieties for virgin soils abundantly supplied with humus. This is the very quality we need to be able to grow a strong-flour grain in this country; and is the quality in Bobs for which I value it more than for any other. It may be said that in seeking for varieties with grain containing less gluten we are contenting ourselves with a lower standard of nutritive value. This, on the face of it, is a very serious objection. Our department, indeed, has long regarded it as one of its most important aims—an aim of, at least, equal value with the prevention of loss from rust and other parasitic fungi—to replace the starchy weak-flour varieties, like the Purple Straws and Tuscans, by sorts which produce stronger flour; and in this and other ways to make progress in the direction of bringing about, so far as it is able and our natural conditions will allow it to do so, a state of affairs in which our people, when they use flour made from our home-grown wheats, will not only be able to make more bread, but that bread a stronger and more perfect food than has been the case in the past. This objection, however, is more apparent than real. If we examine the table which gives the results of the milling examinations of Power's Fife, we shall see that whenever the gluten-content is specially high, the colour of the flour is defective and generally dark; that, in fact, only in those cases in which the gluten-content is less than 16 per cent. is the colour of the flour good enough for the making of attractive bread. As a matter of fact, the flour which is made from the pure Fifes or Red Blue Stems, especially when they are grown in such soils as enable them to develop their special excellencies, is little used by itself for the making of bread. The inferior colour of the bread prevents this flour from being used in a pure state; and it is on that account—in this country, at any rate—used exclusively for mixing with the white and starchy flour made from our home-grown weak-flour sorts. The result is that the greater strength of the mixed flour enables the baker to make more bread from it, while the bread itself suffers little or not at all in colour, and is more attractive because lighter. The average gluten-content, however, of such mixed flours—even of the very best of them, which, for the most part, go into the hands of our Sydney bakers—is much below the average of that which Bobs yields. By the use of such "straight-flour" varieties as Bobs and John Brown (a newer variety of, according to our present standards, very high merit in the mill, as the results of the only two examinations which have as yet been made, and are given in Table III., show), flour of quite as good colour as, and of much better gluten-content and strength than the best that can now be purchased in our markets, would be available.* What we want for our people, as well as for our soils, and what they will want in Manitoba and in those parts of America where strong-flour wheats are grown, for their soils where the virgin richness has been taken from them, are varieties which are like Bobs in being capable of producing flour of high strength from a relatively low content of gluten. Bobs, I am pleased to say, is not the only one of the new varieties which appears to possess this quality. John Brown also, as Table III. shows, seems to possess it in some degree as well. The examination of John Brown, which shows a flour strength of 56 from a gluten-content of only 9·9, differs very little from that of Bobs, with a strength of 56·8 and a gluten-

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* It will be more satisfactory if I give precise figures in comparing the flours, which we are supplied with, in this State, with those which are yielded by the "straight-flour" varieties, Bobs and John Brown. I will present the necessary figures in this small table:—

Flour.	Average samples.	Gluten-		Strength ex n f sack.		Albumenoid ratio (approximate).	
Flour in market, 1902	8	11·0	9·71	287	288·0	1 to 7·1	average 1 to 8·3
Do. 1903	6	9·45		290		1 to 8·5	
Do. 1904	17	8·68		287·1		1 to 9·3	
Bobs	6		11·92		302·4	1 to 6·5	
John Brown	2		12·25		303·6	1 to 6·3	

"Straight-flour" made from Bobs, therefore, according to these averages, contains a higher percentage of gluten than the flour we are in the habit of getting in the market by 2·21, and that from John Brown by 2·54; while a sack of the flour of Bobs bakes into 14½, and of John Brown into 15½lb. more bread. The "straight-flours" made from Bobs and John Brown are, therefore, much better than those which are sold in our markets—make more bread, and that bread a stronger (more nitrogenous) and better food. But my study of this subject leads me to think that this bread, very good though it undoubtedly be, is not the best which it is possible for us to get; and that flour, made from suitable macaroni wheats, mixed with about one-half of its weight of such flour as Bobs and John Brown yield, would give us even better bread—better in flavour and keeping qualities, and of at least as high nutritive value, although of a yellowish colour rather than pure white. In regard to the market flours which have been used in getting the above averages, of those which are used for that of the present year, nine were exhibited at the late Sydney Show, and this ensures their being at least up to the average standard, while the remaining eight were sent to the laboratory by leading millers and merchants for examination The averages for 1902 and 1903 were taken from the flours which leading millers offered for sale in those years. In all cases, in fact, the flours which were made use of have been such as were being supplied at the time of examination by our best millers to our best bakers.

I am indebted to the courtesy of Mr. Guthrie for the results which have been obtained from the flour sent into the departmental laboratory for examination during the last three years.

content of 9·8. That Bobs, however, should have shown, as it did in the examination of the grain grown in the red soil at Moonbi, a strength of 51·6 from so low a gluten-content as 7·4, is remarkable, and shows that the quality of the gluten of Bobs must be very good indeed. But I have been dwelling on the excellencies of Bobs long enough, and now for its weak points. It takes the infection of bunt as easily as the Purple Straws, and that is very easily. Some also consider that it would be better if it held its grain more firmly; but it is not nearly so bad for shelling as Steinwedel and many others.

(*To be continued.*)

DISEASES IN HONEY BEES.

By JOHN SUTTON, Bee Expert.

FOUL BROOD.

A disease that attacks the larvæ or brood of bees, one of the most dangerous and destructive of any of the diseases known to the scientist, who have made it a close study, is so exceedingly virulent that, if not discovered and brought under control, it soon destroys whole colonies, devastates districts, and reaches to unknown places, spreading death and destruction far and wide. When once it has taken possession of any district, the difficulty of thoroughly eradicating it is so great, and its contagion is so active that unless prompt and proper measures are taken the disease soon becomes an epidemic.

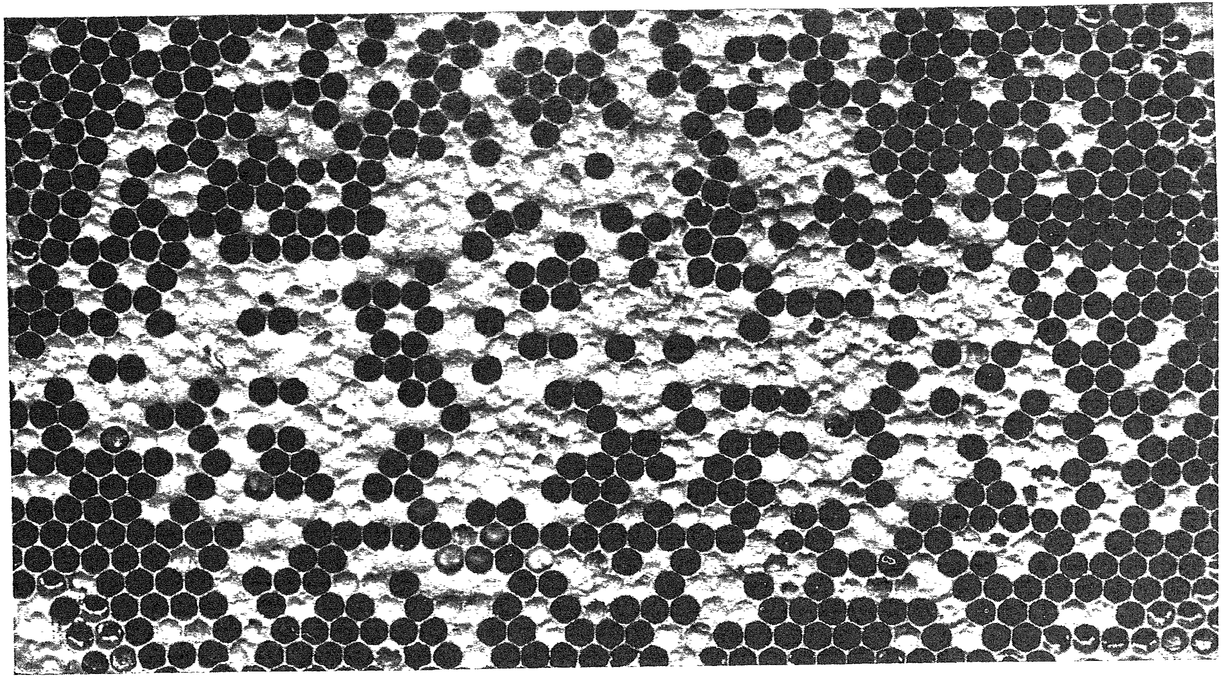
SYMPTOMS.

The first signs of the presence of foul brood is noticeable in the larvæ from the ages of three to six days. At this stage, healthy larvæ occupy the combs in regular patches of brood, the larvæ being then a pearly white, and lying on its side, curled up in a sort of half-moon shape in the bottom of the cells. When disease sets in the larvæ loses its plumpness and whiteness, and assumes a horizontal position in the cell, with an unhealthy pale yellow tint, which, as the disease develops, changes to a brown colour; death ensues, then follows decomposition. The decomposed mass settles in the bottom of the cell as a rotten, tenatious, coffee-coloured matter, which then begins to throw off an intolerable stench. This stench is not present in every case, but is seldom entirely absent, and, in cases where fully developed, it may often be detected a considerable distance from the hive. The smell resembles that given off by old and rotten melted glue, and once experienced is never forgotten. The bees do not appear to make the slightest effort to carry out the foul matter once it has reached the point of decomposition. Strong colonies may, in some cases, remove the dead larvæ in its earlier stages, but weak stocks leave it severely alone. Later the putrid mass shrivels up, and adheres to the sides of the cells in the form of a dry, brown scale. Larvæ attacked at a later period of growth, and sealed up in their cells, die, decompose, and turn to dry scale in the same manner. Such cells will remain closed when adjoining cells, having given birth to healthy brood, are open, and this in itself will often be enough to arouse the suspicion of any one familiar with the disease. The cappings of the diseased brood will be noticeable, as being darker than those covering the healthy brood, and, in some cases, indented, and in others to have a small hole in the centre, with perforations and jagged holes, as seen in the illustration. If one of these cells be opened before the contents have reached the scale stage, and if a pointed toothpick be inserted and withdrawn, it will have adhering to it the sticky, elastic, brown mass which is an unmistakable indication of the existance of foul brood. When any of these symptoms are noticed, an immediate and close examination should be made, and should any dead brood be found, other symptoms should be looked for with the view to discover whether the mischief is due to foul brood or some other disease.

CAUSE.

"Bacillus alvei," is the name given by Cheshire, in 1883, to a rod-shaped, pathogenic micro-organism, causing foul brood. In the early stages, bacilli only is present; but later, spores are produced in enormous numbers. Millions of which may be found in one single dead larvæ. These small and minute spores may be carried in the air on the bodies of robber bees; or by feeding honey to bees from an infected hive; giving diseased combs into healthy hives; transferring bees into a hive that may have contained a diseased colony that has not been cleaned and thoroughly disinfected; the handling of healthy bees by the bee-keeper after manipulating diseased hives; or the introducing of a diseased queen. The spores get into honey, and may be fed with it to larvæ; then will follow a period of incubation, after which the bacilli are produced, which feed upon and destroy the larvæ, and later, again pass into the spore state, to re-appear in the resulting bacilli. The spores are considered more dangerous than the bacteria, because of their wonderful powers of resistance to treatment which would kill, or overcome the bacilli. Spores are capable of growing in any favourable medium, but bee larvæ appears for them a richer soil—offers special attraction. Weak colonies, and any that are unhealthy, in an unclean, or insanitary condition, are, as a rule, the first to be attacked. In many cases, the outbreak is not, as might be supposed, the disease that has weakened the colony, but the weakness of the colony that has invited the disease.

Dr. Howard, in his treatise on the natural history of foul brood, says:—" Bacillus alvei is a pathogenic germ; it is introduced



Foul Brood Colony—in an advanced stage. A little healthy brood is showing. Most of the diseased brood and larvæ has dried down.

from without to the healthy brood; the food provided by the nurse bees being a nutrient medium, active growth at once takes place; poisonous compounds result, and the death of the brood result from these, the germs themselves, or their combined action. To prove positively that bacillus alvei is the cause of foul brood, it is necessary to isolate this germ from the many forms found in rotten masses, to innoculate healthy brood, and then note the positive results. I have found bacillus alvei present in all cases of foul brood examined, in brood of all ages, in the dry coffe-coloured masses, and in the honey in adjoining cells, and where the spores were found, as in the dry masses, in the honey, pure cultures have been obtained, which in turn produced spores."

Many theories have been advanced, again and again, but the real cause of the disease is still unknown; it has, however, been very plainly demonstrated, as in other epidemic diseases, that the weak, sickly, and badly nourished are first attacked, and these in turn become weak. Bees from healthy hives rob them of their honey, and thus carry the germs of the disease with their ill-gotten gains to their healthy hives.

PREVENTION.—"Prevention is better than cure." Foul brood is certainly a disease to which this maxim applies with special force, for while the cure is always to a large extent uncertain the disease may often be prevented by methods which, while they involve very little trouble to the bee-keeper, with a fair amount of knowledge, they are in a great many respects of untold benefit to the bees, and the first instance, and the more desirable of these may be claimed as follows:—

CLEANLINESS: Bees as a rule are wonderfully gifted in this direction, more especially with regard to the Italian strain, as they are careful to remove everything unclean they can possibly do on all occasions. Hives and all appliances should be kept in a condition as unfavourable to bacteria as possible; the lessons taught by the bees themselves is cleanliness. This in itself should be a fixed rule in every apiary and its management. Bottom boards in all cases must be moveable in every hive, and should be cleaned frequently in order that the bees may be at full liberty to carry out their sanitary work in every part of the hive with as little hindrance as possible. The best and safest germicides in foul brood are the bees themselves. If bees were cultivated more, and bacteria less, spores would not so often be found in the hive. Bees when favourably situated can resist the disease to a great extent, and the stronger the colony the greater is their power of resistance.

Medicated foods have been used and strongly recommended by many people, but I have not any faith in them unless administered by those familiar with their use, and it would appear that, from the results, when followed by the average bee-keeper who in most cases fails to give that attention and care in the use of the remedy mentioned, and in some cases should a medicated mixture be given too strong, it may result in the bees forsaking the hive and joining a healthy colony, or settling in some neighbouring tree to become a permanent danger to all within its reach. Hence becomes evident the necessity for extreme caution in using medicated or other advertised foods.

Whatever may be the trouble with your hive apply for information to those persons who are in a position to give reliable advice, and in nine cases out of ten the Government will provide you with the best means of eradicating a pest, or of enhancing the value of the work already performed.

TREATMENT OR CURE.—Foul brood has been known for ages, and many are the remedies prescribed from time to time. It is frequently looked upon as uncurable, and the disease only to be ended by sulphur and fire. Total destruction by fire, however, need to be recommended only when the disease has been allowed to make such headway that the colony affected have been so reduced to such a condition that they are really useless, and not worth saving, or when the beekeeper, who is inexperienced, too indifferent, or too lazy to undertake a systematic and perhaps a very protracted cure. In such cases certainly it would be better and safer to burn the lot rather than leave them to be in a weak and diseased state of infection to attract robber bees from the healthy colonies and to scatter infection throughout the district. The only safe cure is that practised and recommended by Mr. McEvoy, foul brood inspector of Canada, and who is reputed to have had the most experience of any person on that continent, and he recommends thus:—

> "In the honey season, when the bees are gathering freely, remove the combs in the evening and shake the bees into their own hive. Give them frames with comb foundation starters on, and let them build comb for four days. The bees will make the starters into comb in during the four days, and store the diseased honey in them which they took with them from the old comb. Then in the evening of the fourth day take out the new combs and give them comb foundation to work out, and then the cure will be complete."

This method will appear to be exceedingly simple, and on the face of it easy of execution, but it must be noted every care must be taken that the old frames containing the diseased brood and honey must in no case be left where the flying bees can reach it, and the same refers to the new frames worked out from the starters on the first set of frames given to the bees. Whether it is safe or wise to save the wax and honey is, to say the least, questionable. It may work all right in the hands of any person who has experience, and who knows the risk there is at stake, but otherwise I would advise the total destruction of frames, honey, and wax as the safest, and may be the wisest thing to do. The hive, however, could be saved, thoroughly and properly cleaned and disinfected before again used for hiving bees.

In case it is preferable to burn wait till all bees are done flying, then close the entrance so not a single bee can escape; place in a suitable iron vessel about two (2) tablespoonfuls of brimstone, keeping this below the frames in case of danger from fire; put some live coal into the vessel with the sulphur and close every crevice until the bees are dead; then having prepared a suitable place on which to cremate—an excavation into which the hive and its contents could be placed—throw in some kindling, then the hive and contents, a little coal oil (kerosene), and light the lot, which would in a short time complete the task.

INFECTED HONEY.

Honey taken from infected hives, although quite safe for the owner's use, should in no case be fed to bees, not even after boiling. It has been proved that spores of foul brood can be communicated to larva in boiled infected honey if fed to them, and that spores will survive chemical treatment.

DISINFECTION INDISPENSIBLE.—Too much emphasis cannot be be laid upon the necessity of thorough disinfection of the hands, clothing, and of hives and frames, combs, and all appliances which may have been in use while in contact with this terrible disease. No remedies can by any possibility prove satisfactory or effectual unless they include disinfection. Even the place or ground on which the hive has stood should not be overlooked, because no matter how careful any person may have been, small particles of injurious matter may have been thrown out of both comb and dead larvæ and the accumulation of bees that have perished by the disease. The ground should be turned over and the sod turned under. Neglect of this detail may bring a relapse of the trouble amongst other hives.

Once the disease has been brought under control, no time should be lost in re-queening the hive or hives that have been affected; indeed, if other hives are adjacent, and those having shown not any sign of being infected, a general re-queening should be carried out, as a young, vigorous queen would give a better tone to the colony or colonies.

While these remarks and instructions refer in every case to hives of modern construction and modern practice, they are hardly applicable to the common or box hive. In the frame hive the bee-keeper has the opportunity of observing and checking the advance of this or other diseases, but this cannot in any sense be applied to the box hive, as here is often to be found the *crux* of the whole matter, for in most cases these hives are neglected, and old comb accumulated year in and year out, verily breeding grounds for diseases and pests of every description, to the detriment of those who with care and close attention may have built up a large and profitable apiary, only to be ruthlessly, and in some cases suddenly, brought to grief and ruin because of the neglect and carelessness of others.

(To be continued.)

ALBANY HONEY FLOWS.

At the May (monthly) meeting of the Plantagenet Beekeepers' Association, held at Albany, a paper was read on the main honey flows of the Albany district, giving the order and seasons of the jarrah, red gum, blackbutt, and the annual flowering trees; also flavours and qualities of the different honeys. The substance of the paper was as follows:—

In the Albany district there are such a variety of shrubs and plants that the bees can nearly always find some blossom containing more or less honey and pollen with which to keep up brood rearing and sometimes gives a surplus, but the main honey flows are from the trees, and depend on the seasons. In the spring we can depend on the tailorena, gorse, acacia, and fruit trees, and in the autumn, bottlebrush, but the gum trees do not flower more than once in two years. The jarrah, flowers in the spring, from October to December, the blackbutt in summer of the same season, January and February. About thirteen months later (in March and April) the red gum flowers, followed in the spring, by jarrah again. The willow flowers every November, but only yields honey once in three or four years. The jarrah is a light honey, with a nutty flavour and the best for comb-honey.

Blackbutt produces a light, fine-grained honey, denser than jarrah. Red gum is rather darker in colour, and the favourite honey with most people. Tailorena is a very thin, light coloured honey, lacking in body. Willow, is a first-class honey and almost colourless. Bottlebrush, is a dark honey, and, being late in the season, is used mostly for wintering.

NOTES ON SEED POTATOES.

I. FRASER, Cornell University.

It is often advised that potatoes be obtained from another soil and from a more northern latitude if vigour and delayed maturity are desired, and from a southern latitude if earliness is sought; but, generally speaking, potatoes bred for a district do better there than elsewhere. Few European varieties of potatoes are worth growing in America, and any introduction requires acclimitisation and selection.

Potatoes vary in the time they take to germinate. Mature potatoes will not begin to grow until they have had a rest. In some varieties this may be but a few weeks; in others, months. Trays are the best means of storing new varieties purchased or grown in small quantities. In them the seed cannot heat; a large quantity can be stored in a room; it can be easily examined and conveniently moved for sprouting, or to the field.

Sprouting seed potatoes in a well-lighted room increases the yield and earliness, produces a more vigorous growth of vines, and a larger starch content in the tubers. Another great advantage is that sprouting gives an opportunity to "rogue" the variety. Almost every variety shows a difference in the sprout, either in colour or habit of growth. One may have a white, spindly stem, which becomes green on exposure; another a short, sturdy stem, which becomes a bright red; while another may be purple, and so on. So far, I have found the "sprouting stage" the most reliable one at which to note differences in varieties, and varieties of potatoes may be distinguished as readily as varieties of other crops.

The disadvantage of sprouting potatoes is that the tubers must be planted by hand, on account of the liability to knock the sprouts off if passed through the planter. There are many local markets in the United States poorly supplied with early potatoes, and to supply such a small area of the crop could be profitably handled as above described. A distinction must be noted between the above method and the slovenly practice of many who allow their seed tubers to send out long sprouts before planting.

Formerly it was advised to cut the potatoes a few days before planting. Generally speaking, this is a mistake. Zavitz reports as the result of hundreds of trials, during a period of eight years, that potatoes cut the day of planting gave eight bushels heavier yield than those cut four to six days before planting.

It is a matter of general observation, supported by experiment, that large seed usually insures a larger yield than small seed. This may be due to the greater amount of nourishment, which enables the young plants to make stronger growth, and to the greater hereditary vigour posssessed by such tubers. Good-sized seed is especially desirable on light soils and for early maturing varieties. Smaller seed from vigorous plants may be as satisfactory with late varieties, owing to their longer period of growth. The advisability of using large or small seed, cut or whole, depends largely upon the cost of the seed, the season, the culture given, and the price realised when harvested. Generally speaking, tubers weighing two to three ounces make the most profiitable seed.

I have found from 17 to 20 bushels are necessary to furnish a good seeding; others advocate the same amount, although a less quantity is frequently mentioned as satisfactory. A compilation of experiments made at 13 stations to determine the proper amounte of seed shows that, within ordinary limits, an increase in seed produces a marked increase in total yield and marketable potatoes; and an increase in the size of the seed from one eye to half a potato produces an increase in the net value of the crop.

A comparison of the half potato with the two eyes shows that, for the total yield (large and small) of 95 experiments, 76 are in favour of the half potato, and 19 in favour of two eyes; for marketable yield, not including small ones, of 73 experiments, 58 are in favour of the half potato, and 15 of the two eyes; for net marketable yield, that is, deducting the amount of seed of 30 experiments, 23 are in favour of the half potato, and seven in favour of the two eyes; for net value of crop (value of crop less value of seed) of 30 experiments, 22 are in favour of the half potato, and eight in favour of two eyes.

A comparison of the whole potato with the half potato shows that for the total yield, large and small, of 54 experiments, 46 were in favour of the whole potato, and eight in favour of the half; for the marketable yield, minus small ones, of 42 experiments, 36 were in favour of the whole potato, and six in favour of the half; for the net marketable yield, deducting amount of seed, of 13 experiments, seven are in favour of the whole potato, and six in favour of the half; for the net value of crop (value of marketable less value of seed planted) of 12 experiments, seven are in favour of the whole potato, and five in favour of the half.

MAKING NESTS FOR TURKEYS.

Turkey hens very often steal their nests, or, in other words, lay away; and it is a difficult matter to find the eggs, especially when they are kept on a farm, or wherever they have a large range. A big nest should always be provided for a turkey, from 20in. to 24in. square; if not, they often injure their tails, and the feathers do not get straight again before they moult. A large tub or barrel laid on one side and some soil put in, which should be well shaped in the form of a nest, made perfectly round, will do well.

The proper way is to put a little damp soil in the nest, beat it down well so that it is quite firm, then shake a little slack lime all over it. This causes the inside of the nest to become firm. It should then be lined with fine hay. A turkey hen can be set on from 17 to 20 eggs easily, if set carefully. A larger number can be put under her, but it is always better to put one or two less than too many. The first batch of turkey eggs should be put under ordinary hens. A good-sized hen can take nine or 11 turkey eggs very well. Hens will take great care of them.

If a turkey hen is put up in a large coop with bars to it as soon as she becomes broody, and is fed liberally, she will soon come on to lay again. Then, when she comes on broody the second time, if the owner has a sufficient number of eggs, set the turkey; but if not, set the ordinary hens, and the former will lay another batch of eggs the same as before.

While sitting, a turkey hen should always be covered or put in a dark place, and if she does not come off in the morning to feed, she should be lifted off steadily, and have proper food given her. Maize, barley, and dry rice are the best grains for turkeys while they are sitting.

If they are fed well, they will sit two months if allowed. After a turkey has been sitting nine days, the eggs should be tested before a candle or lamp in the evening. The best way is to hold the lange end of the egg between the thumb and finger, and turn steadily round before the light. If the eggs are fertile they will be very cloudy, and a dark speck will be seen rather nearer the large end; but if they are unfertile the eggs will be quite clear. They are very easy to test on the ninth day. Turkey eggs, as a rule, take 27 or 28 days to hatch out; but they should be left till the morning of the 29th day, because they may be a little late in hatching out.

If an egg is not chipped by the 29th day, an incision should be made in the end, just at the top, and if the skin is white it is a sign the young turkey is alive, but if it is dark the youngster is dead. If alive, the egg should be held up carefully, the small end to the light, and just tapped lightly with the finger, and the position of the beak will be seen at once. As an egg is oval, unless the beak lies perfectly straight it slips, and the youngster cannot break the shell. Numbers of young turkeys die in the shell every year for want of a helping hand. If a little care is bestowed, the young birds can be saved.

AGRICULTURAL IMPORTS.

The following is an account showing the quantities of certain kinds of agricultural produce imported into the United Kingdom in the week ended 22nd April, 1905, together with the quantities imported in the corresponding week of the previous year:—

	1904.	1905.
	No.	No.
Cattle	7,432	12,437
Sheep	6,640	3,817
Swine	...	...
Horses	401	270
	Cwt.	Cwt.
Beef	87,602	108.177
Mutton ...	85,730	89,066
Pork	9,235	6,974
Bacon	93,643	98.144
Beef, salt ...	1,324	2,916
Hams	19,366	27,414
Pork, salt ...	6,233	2,303
Meat, salt and fresh ...	16,801	17,414
Meat, preserved	15,724	13,055
Butter	95,844	95,352
Margarine ...	17,407	21,241
Cheese	27,472	29,188
Milk, fresh, in cans or drums	...	...
Milk, Cream ...	94	71
Condensed Milk	19,670	15,294
Milk, preserved (other kinds)	18	13
	Gt. Hund.	Gt. Hund.
Eggs	316,625	277,218
	Value.	Value.
Poultry and Game ...	£20,962	£25,005
	Cwt.	Cwt.
Rabbits ...	6,031	8,287
Lard	30,144	45,348
Wheat ...	1,381,200	1,860,600
Flour	277,100	188,900
Barley ...	512,000	110,700
Oats	193,800	291,700

	1904.	1905.
	Cwt.	Cwt.
Peas	30,100	19,578
Beans	13,780	6,570
Maize	862,200	816,700
Apples	46,591	43,232
Apricots and Peaches ...	1	1
	Bunches.	Bunches.
Bananas ...	73,699	43,417
	Cwt.	Cwt.
Cherries ...	...	...
Currants ...	...	...
Gooseberries ...	...	...
Grapes	291	238
Lemons ...	10,174	8,757
Oranges ...	187,478	87,765
Pears	608	704
Plums	...	...
Other Fruit ...	978	2,584
	Tons.	Tons.
Hay	3,168	1,894
Straw	2,985	2,090
Moss Litter ...	...	1,492
	Cwt.	Cwt.
Hops	851	1,971
Locust Beans ...	8,100	3,500
	Bush.	Bush.
Onions	90,767	327,156
	Cwt.	Cwt.
Potatoes ...	398,168	27,478
Tomatoes ...	19,387	19,117
	Value.	Value.
Other Vegetables	£18,600	£14,475
	Cwt.	Cwt.
Dried ...	710	2,310
Preserved by canning ...	4,024	6,193

—*Mark Lane Express.*

GARDEN NOTES FOR JULY.

By PERCY G. WICKEN.

July is, as a rule, the coldest and wettest month of the year; the soil is generally wet and very little in the way of digging and cultivating the ground can be done. The exceptionally heavy rains which fell the last week in May have, in many instances, caused the ground to become saturated, and unless we are favoured with some dry weather, the soil in the Southern districts will be too wet for much to be done in the way of gardening. This excessive wet will do much to demonstrate the necessity of draining land for garden and orchard purposes, and now that agricultural drain pipes can be obtained locally at a reasonable rate gardeners and orchardists should take into consideration the advisability of putting down a system of underground drains, and thereby increase the yield obtainable from the same area of ground. A system of drains causes the rainfall to soak through the ground, thus opening the pores and allowing the air to follow the water and aerate the land; the drained land becomes much warmer than the undrained land, and the crops grow quicker and come to maturity earlier, the land becomes sweeter, and the crops are free from many diseases which are caused by the stagnant water in the soil causing the roots of the plants to rot. Provided a good outlet and sufficient fall for the drain can be obtained, pipes will be found the most lasting and effective drain that can be constructed. In many districts the carriage of pipes would make them become expensive, and where this is the case stones, bushes, or logs such as blackboys may be used with satisfactory results. As a general rule the deeper the drains are put in the further apart they may be placed, but with the deeper drains the cost of digging is heavy. In most soils the best depth is between 30 and 36 inches, and the distance between the drains about 44 feet. Where the length of the drain from the main drain does not exceed 20 chains, 2-inch pipes are sufficient, for longer distances however a larger pipe is required. Where plenty of grass sods can be obtained, the sods should be laid over the pipes, grass side down, before the drains are filled in; where grass is not obtainable, bushes, rushes, or the tops of trees will answer the purpose; this, to a large extent, prevents the soil from percolating into the drain. If underground drains are out of the question ample provision should be made to carry off all the surplus water by means of plough-furrows or open surface drains, the ground between the drains being somewhat hilled up. Stagnant water is obnoxious to plants, and no ordinary plants will flourish when the water in the soil is stagnant.

Where possible land should be prepared for early spring sowing, and a plentiful supply of stable manure dug into the ground. Such plants as cabbages and cauliflowers can be planted out from the seed-beds as soon as available, and if well manured will grow quickly and give a speedy return.

ARTICHOKES (Globe). The best time for planting is the early spring, but a few early ones may be planted out this month. Either suckers or young plants may be put out; they should be planted about three feet apart each way.

ARTICHOKES (Jerusalem) are of a different nature to the Globe, and produce tubers on the roots somewhat similar to the potato, although they belong to the same tribe as the sunflower, and the flower resembles the dwarf sunflower. They are propagated by the division of the roots; in early localities may be sown by the end of the month. Sow in rows three feet apart and about 18 inches apart in the rows.

ASPARAGUS.—Prepare land as described in previous issues, and in warm districts a few Crowns can be put out, but they will do better planted next month.

BEANS (Broad).—Should not be bearing; in cooler localities a few more rows may be put out.

BEANS (French).—In the north a few rows may be planted for the early market; in the southern districts it is too risky.

CABBAGE.—Put out as many plants as you are likely to require either for home use or for market purposes, and sow some seed of an early variety, such as Succession, or St John's Day, so as to obtain plants to put out later on. A few red cabbage plants will also be found useful.

CARROT.—Thin out those already up, and sow a few more rows of seed for future use.

CAULIFLOWER.—Plant out any plants that are available, and hoe round those already growing.

CUCUMBERS.—Early cucumbers can be raised under glass, or plants can be raised with the aid of a hot bed and glass frame for planting out in the warmer districts. In warmer localities plants can be planted in the open next month.

LEEKS.—Plant out any seedlings that are strong and healthy in shallow trenches; a little seed may be sown for further use.

LETTUCE.—Plenty of plants should be available for planting out; they should all be planted as soon as strong enough to move, and the ground well manured. Sow seed for future use.

ONION.—Plant out, in well-prepared and manured soil, all the plants that you have available. Sow seed for future use, or the seed can be sown direct in the field, and the plants thinned out when they come up. They require a well-drained soil, and will not succeed where it is too wet.

PEAS.—Sow, during the month, a large supply of this vegetable; they are always in good demand. Plant in rows three feet apart, so that either the horse or hand hoe can be worked between the rows. Manure well with superphosphate and sulphate of potash. Next season the nitrogenous bacteria will no doubt be available in larger quantities; this season the supply is limited.

POTATOES.—In the warmer districts potatoes can be planted out; where there is still danger of frost the ground should be prepared ready for planting out later on.

TOMATOES.—Plants for early planting can be raised under glass or in boxes, which can be carried inside at night. Only plant smooth-skinned varieties, the wrinkled ones are of very little value.

TURNIPS.—Thin out those already up and plant a few more rows for later use. Swedes will probably succeed better than white turnips at this time. All weeds should be kept and the ground between the rows kept well hoed.

FARM.—Seeding operations should now have been completed in all parts, the seed-drills cleaned and put away for another season. Owing to the early rain seeding operations have been unduly delayed, and, as usual, a number of people were unable to get in all they anticipated owing to the ground becoming too wet. This again demonstrates the necessity of either fallowing or getting the land ploughed during the summer, so that when the first rain comes seeding operations can be carried out without a break. Plough-furrows or small drains should be made in places where the water is likely to lie on the crops so as to run as much of the surplus water away as possible. Wet weather should not be a time of idleness on a farm; there are many indoor jobs to do, such as repairing harness, wagons, or implements, putting in a few nails here and there, making a cheap gate or two to take the place of the slip-rails. If the chaff-cutter is put under shelter, chaff-cutting, wood-sawing, etc. can be done when it is not possible to work outside. A lot of ear-cockle has been sown in the seed-wheat this season; this will cause the disease to spread, and next season it will be worse than ever. All seed should be graded before sowing, and then all affected ears will be taken out; also, if when pickling wheat it is dipped in the pickle in an open basket and well shaken about, most of the affected grain will float on the surface, and can be removed. If the ground is not too wet, rape and mustard, for sheep feed, may still be sown, and the ground prepared for sowing lucerne next month. The land for lucerne requires to be thoroughly well worked, and to be quite free from weeds. A lucerne crop remains in the ground a long time, and it will be found profitable to put the necessary work into the ground before sowing the seed.

LOCAL MARKETS' REPORTS.

MESSRS. F & C. PIESSE, THEO. LOWE, & Co., LTD., REPORT.

Messrs. Piesse, Lowe, & Co., Ltd., report as follows under date of 6th June:—Supplies of fruit, for the last month, especially apples, have been very large, but we expect a falling off in local apples. Large supplies of imported are coming forward. The following are the present prices realised: —Apples, Rome Beauties, are selling at from 6s. 6d. to 10s. a case; French Crabs, at from 7s. 6d. upwards; Jonathans realised at from 6s. 6d. to 10s. 6d. a case; Scarletts, at from 5s. 6d. to 8s. 9d. a case; Rhymers, 6s. 3d. to 7s. 6d. a case; Sturmers are selling at from 6s. 6d. to 8s. 6d. a case; Stone Pippins are realising at from 5s. to 7s. 9d. a case. Pears have been very scarce, and we are selling the best dessert kinds at from 12s. to 15s. a case; Thompsons are selling at from 6s. 9d. to 8s. 9d. a case; and mixed varieties from 6s. 9d. upwards; cookers, from 5s. 9d. upwards. Oranges: Local, are selling at from 5s. 6d. to 7s. 9d. a case. The best Navels, making at from 14s. 9d. to 15s. 6d. a case. Mandarines are selling at from 12s. to 16s. a case. Lemons, 10s. 3d. a case. Bananas are selling at from 4s. to to 5s. 6d. Raisins, 4½d. to 6d. per lb. Almonds, 6d. a lb. Vegetables have been coming forward in very large quantities, and prices in consequence have been very low for this time in the year. Local potatoes, in the early part of the month, were in fair quantities, and the price ranged from £6 per ton upwards. The present price for good potatoes (local) is from £9 10s. to £11 per ton; cabbage is selling at from 2s. 3d. to 2s. 6d. a bag; beetroot, making 6d.; spinach is selling at from 5d to 1s. 2d.; Chinese turnips, 5d.; and other varieties are selling at from 4d. to 11d. per dozen bunches; rhubarb is selling at from 1d. to 1½d. per lb.; water-cress, 5d.; pumpkins are selling at from 2s. to 4s. 6d.; cauliflowers are selling at from 2s. 9d. up to 7s.; carrots, 7d.; celery is selling at from 7d. to 2s. 3d. Poultry: We had very good supplies forward, and the following are the prices realised:—Turkey gobblers are selling at from 10s. to 17s. a pair; hens, at from 8s. to 10s.; ducks are in good demand, the best selling at from 5s. up to 8s. 6d. a pair; fowls are selling at from 4s. 6d. to 5s. 3d. a pair; chickens, at from 2s. to 2s. 6d. a pair. Eggs, 2s. 2d. to 2s. 4d. per dozen. We have had several consignments of pork forward during the month, and the price realised has been about 5d. per lb.

THE PERTH FRUIT AND PRODUCE EXCHANGE.

The Perth Fruit and Produce Exchange report for the month ending 8th June as follows:—

Fruit.—There have been good supplies of seasonable fruits forward during the month, and satisfactory prices have been secured for the producer. Apples, of course, have been the main source of supply, and some very fine samples of Jonathans and Rome Beauties have been disposed of. These varieties, together with Cleopatras, are favourites with buyers. Prices for these lines have run from 8s. to 12s. Cookers have been in good demand at from 7s. to 9s. Grapes are now finished. In the early part of the month, Doradillos realised from 5s. to 6s. 6d.; Muscatels, 6s. to 8s.; Wortley Halls, up to 8s. Pears have met with a very ready sale, and prime specimens have yielded up to 14s. Quinces: This useful variety of fruit has also sold well at prices ranging from 4s. to 6s. Lemons also have quitted readily at from 5s. to 8s., according to sample and size. Oranges are now coming along in fair quantities, and navels meet with ready sale at from 9s. to 11s.; St. Michael's, 5s. 6d. to 7s. Mandarins are just beginning to arrive, and good samples are worth 12s. to 14s. 6d; medium, 9s. to 10s.

Poultry.—There have been regular supplies of these forward, but prices have been somewhat low, except for really good lines of killing birds, and these always bring satisfactory prices. Turkeys (gobblers), 20s. to 22s. 6d.; hens, 12s. to 15s. Ducks, up to 7s. 9d. Fowls, prime birds, 6s. to 7s.

Eggs.—This is somewhat a neglected line, and producers would do well to keep their attention directed to the supply and demand of the same. At the moment fresh eggs are worth 2s. 3d.

Vegetables.—We have had tremendous supplies of these, but the demand is somewhat below the supply.

HENRY WILLS & CO.'S REPORT.

SKIN AND HIDE.

Messrs. Henry Wills & Co. report under date, 9th June, as follows:—

Sheepskins.—Since our last report prices have been very steady for all classes with a tendency upwards, especially for sound-pelted, slightly coarses woolled skins. Best clean full-woolled sound merinos are worth up to 7¾d. per pound, and the same in crossbreds 7½d. per pound; ¾ woolled 6¾d. to 7¼d.; and other classes at the same rates as quoted last month.

Kangaroos.—This market has been very firm, but the American buyers say that they cannot stand present rates and that prices must go down. We are, however, still offering the extreme prices which we reported last month.

Opossums.—No sales have taken place since last report, but we have slightly raised our buying prices, which will remain firm until the 21st instant, when the next sales take place in London. If the peace prospects remain good, prices will hold, or perhaps go up a little, but if the Eastern war continues, prices must ease considerably.

We ask all our country friends to watch for next month's report on all three of the above lines as it will be a very important one.

Hides.—Prices have eased somewhat since last issue and present indications are that they will go still lower. Very heavies and special condition are worth from 5d. to 5¼d. per pound; other weights to 4½d. per pound except, for anything extra good, which would be worth up to 4¾d.

Tallow.—We specially bring this line under the notice of farmers as it is well worth looking after. In casks in shipping condition it is worth 20s. to 20s. 6d. per cwt., and in tins 17s. to 19s., according to quality.

Horse hair, beeswax, horns, cow hair, etc., remain firm at latest quotations.

We would specially impress on all growers the importance of not bundling and consigning their skins until they are quite dry, and the necessity of following the suggestions as to preparing our lines for market as set forth in our blue card of suggestions, which we supply free of cost. In order to realise full prices it is necessary that the lines in which we deal should be forwarded in good order and condition.

We advise that all skins, but especially sheepskins, should be sent forward as fast as possible, as prices are very high indeed, and it is well to take advantage of the extreme market.

H. J. WIGMORE & CO.'S REPORT.

Messrs. H. J. Wigmore & Co. report as follows in connection with their daily sales of produce, held at Perth and Fremantle, for the month ended 9th June:—

Chaff.—During the month the supplies have been somewhat greater than during the preceding month, but still continue short of the demand. The shortage has been made up by stored chaff, and we estimate the quantity still in auctioneers' hands in Perth and Fremantle to be between 300 and 400 tons. It was only natural to expect that the high prices which have ruled during the month would induce farmers and holders to send in consignments to Perth markets, and these will probably continue until practically the whole of the chaff in producers' hands is exhausted. From careful and exhaustive inquiries made by ourselves throughout the State, we estimate that there is a very considerable shortage of the State's requirements, and this shortage will probably make itself acutely felt during the months of July, August, and September. The market has ruled remarkably firm during the whole of the month, and we have no change whatever to record in prices. F.A.Q. to prime green wheaten remains very firm, as per last monthly report, viz., £5 to £5 2s. 6d. Good medium wheaten, £4 10s. to £4 15s.; very good demand. A considerable proportion, however, of the chaff which has been sent in recently has been damaged, and naturally slightly lower prices have had to be taken as the proportion of the damaged chaff became greater. Good oaten chaff maintains its value, and for a few trucks, really prime, £5 could probably be obtained under the hammer. During this month the whole of the stored chaff in Perth will probably be disposed of, and, should comparatively short supplies be then experienced, higher prices must, in our opinion, rule. To those farmers and speculators who hold we do not think there is any need whatever to anticipate lower values ruling. Should larger supplies come in temporarily, probably lower prices would occur for a day or two, but as the produce buyers are keenly alive to the situation, there is no doubt that they would welcome any slight fall to replenish their present exhausted stocks. We repeat our previous opinion that a £5 10s. market may easily be looked for, and we should not be surprised to see same during June. The Fremantle market is always erratic, and during the week prices have not ruled quite so firm as Perth. This, however, is no criterion whatever, and very often we find it necessary, in order to secure a fair price for our constituents, to rail chaff back to Perth which has been consigned to Fremantle in error. At best the Fremantle market is a very small one. During the week ended to-day 81 trucks only have been auctioned in Perth. This is nothing like the quantity required for Perth consumers, and it must not be forgotten that quite a considerable proportion of this chaff is again railed to different destinations after sale. That the Northam people share our views is proved by the fact that prime green wheaten chaff has already been raised by holders there to £5 on rails, Northam, which is equivalent to £5 10s., Perth. We will sum up our remarks on this commodity by again expressing our strong conviction that high prices will rule in the near future.

Wheat.—Since our last monthly report a decided firmness has manifested itself in this market. We have sold heavily privately during the past week at prices equivalent to 3s. 5d., and even higher at country stations; 3s. 9d. can now readily be obtained at auction for any samples up to and approaching prime milling. We look for even higher prices in the near future, as wheat throughout the State is, according to our advices, very well held.

Seed Oats.—Contrary to expectations, the demand for Algerian seed has been heavy right up to and inclusive of this week. Importers, however, had cleared out most of their stocks some fortnight or three weeks ago, and it has been extremely difficult to fill in orders with satisfactory seed. Prices have ranged from 2s. 10d. up to 3s., according to quality.

Algerian Feed Oats.—There have been no local supplies of moment during the month, the whole of the requirements having been met with Victorian feed Algerians. Values 1s. 7½d. to 1s. 9d. f.o.b. Melbourne, according to quality; 2s. 4½d. to 2s. 6d. for good feeds on trucks Fremantle.

Flour.—We have no alteration to record, but we have made considerable sales during the month at £8 7s. 6d. on rails Northam, and have also sold largely Thomas' Adelaide Standard at £7 12s. 6d. f.o.b. Port Adelaide; quarters in each case 5s. extra.

Bran and Pollard.—These commodities have eased somewhat during the month. We are now quoting £6 5s. on rails Northam for pollard, with light stocks; £6 12s. 6d. for bran, with also very small stocks. These prices permit of only light business being done, most of the supplies being railed to the fields. Bran has eased in Sydney and Melbourne, and may now be quoted there at 9½d. and 10d. respectively; pollard, 10d. and 10½d. f.o.b. respectively. On spot, we quote £6 10s. for bran and £7 for pollard.

Bran Bags.—Have firmed slightly, and have moved off considerably during the month. We invite correspondence from farmers requiring, as we continue to hold our usual stocks.

Hay and Straw.—Very little business has been done during the month. Straw may be quoted at £2 on rails Perth.

THE CLIMATE OF WESTERN AUSTRALIA DURING MAY, 1905.

The weather for the month was very stormy and interesting. It generally happens that a definite date can be assigned for the commencement of winter, and in the present case the season broke on 1st May.

There were three main disturbances affecting the weather, and it is considered worth while to study these a little in detail, for it seems not unreasonable to suppose that the manner in which a season announces itself will in time afford a clue to the character of the weather for the remainder of the season. At the beginning of the month barometers were falling and a depression was evidently approaching the Leeuwin. On the morning of the 2nd the winds were west and south-west thence to Esperance, east of which they were north and north-east. On the 3rd they had backed, being north-west in the extreme south-west, elsewhere north, and north-east in South Australia. On the 4th north-west at Leeuwin, thence west and south-west as far as Eucla, and still north to north-east in South Australia. On the 5th they had backed to north-west and north all along our coast. On each occasion the barometer fell as the wind backed from west or south-west towards the north, with tendency to finer weather, and rose as the wind came round again, with heavy squalls and rain.

The above must be compared with the pressure in the south-east portions of Australia, where a "high" was established over Tasmania on the 1st, and this was gradually squeezed northwards towards New South Wales and Queensland.

When the anti-cyclone was definitely established there, the "low" south of our own coast managed to pass along towards Tasmania, and was followed by a "high" over our southern districts, with finer weather.

This "high," which came in from the Indian Ocean on the 7th, passed slowly eastward, reaching Adelaide on the 12th, and Melbourne on the 15th.

On the 11th another "low" approached our west coast, the isobar of 30·0 running right round the western coast line. On the 12th (just when the "high" had reached Adelaide), the wind had veered to west-north-west, at Leeuwin, but was northerly thence to Eucla. On the 13th heavy rain was recorded in all western districts, as far north as Onslow. On the 14th (Sunday) reports were somewhat incomplete, but westerly winds had only reached Albany. On the 15th, it had backed to north west at Leeuwin and Albany. The "high" was now at Melbourne. On the 16th, the wind remained north-west, but the barometers had risen, the "low" apparently going southwards. The "high" was now beginning to work up the east coast. On the 17th, winds had reached south-west at Leeuwin and Albany, thence eastwards west to north-west, and north to north-east in South Australia. The "high" was now off the Eastern coast near Sydney. By the 18th a rapid movement eastwards had taken place, the "low" being south of Victoria, and a "high" passing over our southern districts. Next day (19th) the "high" reached Adelaide, then progressed slowly eastward. On the 20th, the third disturbance of the month approached our west coast, rain being reported at Carnarvon and Winning Pool, and barometers fell rapidly. On the morning of the 21st the centre was near Bunbury, certainly north of the Leeuwin. This point is important, in view of the theory I have advocated as to the direction whence these storms approach our coast. At 8 a.m. on the 21st the barometer was reading 29·55 at Cape Leeuwin, wind east; 29·52 at Cape Naturaliste, wind east; 29·46 at Bunbury, wind north-north-west; 29·60 at Perth, wind north-west; and 29·71 at Geraldton, wind south-west. The "low" then worked down the coast and round the Leeuwin (the wind veering, not backing at this place); and on the morning of the 22nd the wind was west-south-west at Leeuwin, north-west at Albany, thence north and north-east to Adelaide. On the 23rd, it was westerly as far as Eyre, north-west at Eucla, thence north and north-east in South Australia. So far, the "low" had gone straight ahead, but the winds now began to back again, and on the 24th they were north-west and north all along our south coast, but still north and north-east in South Australia. On the 25th, winds were westerly from Leeuwin to Esperance, thence north-west to Eucla, and thence north. On the 26th they had backed again, being north-west at Leeuwin and Albany, thence north. During the last few days the "high," which had reached Adelaide on the 19th, was moving very slowly eastwards, and eventually, on the 26th, seems to have passed northwards up the east coast to the neighbourhood of Brisbane. After this our "low" moved rapidly towards Tasmania, and the weather moderated.

We see, therefore, that the three disturbances which ushered in the present winter season, and produced such abundant rain throughout our State, were similar in character. They each possessed a feature which requires careful study, as it is due to this particular characteristic that the downpour was so heavy. As a general rule, any winter "low" which arrives at the Leeuwin has a tendency to pass eastward or east-south-east towards Tasmania, giving heavy coastal rain as it passes, with winds in the north-west quadrant. Under normal conditions, the wind gradually veers west, south-west, and south, and the weather moderates. But in the present case each of the three "lows" found itself unable to proceed on account of the presence of a very slowly-moving "high" in South-east Australia or Tasmania, and seemed to rebound two or three times. Thus, as the "low" moved eastward, winds would veer to the west, then as the "low" rebounded from the "high" they would back again to north-west and north, and the squally weather would start all over again as the "low" made another attempt to move eastward.

When the "high" was finally removed, in each case travelling northward, the "low" rushed forward rapidly, bringing heavy rains to South Australia as it passed, but with clearing weather following almost immediately. The result of the whole movement was that we had a rainfall far in excess of the average, whereas in South Australia, though there were two or three good downpours, the general character of the weather was that of an unduly prolonged summer—warm, dry, and dusty.

It will be seen from the above what an important part the Tasmanian observations play in even the daily forecasting for this State, as from them may come the first intimation of the movement of the "high" pressure. Unfortunately, under present arrangements, these observations are not always received in time to be utilised.

On the whole, the pressure was unusually low, ranging from ·04inch below normal in the extreme north to over a quarter of an inch in defect in southern districts. The temperature was generally above the average in the interior and northern portions of the State. In west and south coastal districts it was below in the day and above at night, having considerably less diurnal range than usual.

Frosts have not yet started, the lowest reading of a terrestial thermometer being 31·0 at Southern Cross.

The Climate of Western Australia during May, 1905.

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						May, 1905.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
North-West and North Coast:	Wyndham ...	29·944	29·984	30·160	29·745	93·2	74·0	83·6	97·6	65·6	90·5	71·4	100·4	58·0	*Nil*	*Nil*	1,080
	Derby ...	29·956	29·990	30·143	29·797	92·2	65·4	78·8	98·2	53·2	89·6	63·7	98·8	46·0	6	1	1,305
	Broome ...	29·941	29·996	30·130	29·810	89·0	66·0	77·5	95·2	55·4	87·9	62·5	97·3	46·4	118	3	490
	Condon ...	29·942	30·036	30·157	29·822	82·6	60·8	71·7	90·0	49·8	82·2	56·8	98·0	42·0	201	6	406
	Cossack ...	29·966	30·044	30·148	29·814	84·4	64·9	74·6	94·0	56·5	83·1	62·4	96·5	51·0	416	5	650
	Onslow ...	29·955	30·036	30·140	29·770	83·0	62·0	72·5	95·0	51·0	83·6	59·5	95·0	45·2	230	7	473
	Winning Pool	...	...	...	...	...	...	...	...	...	...	...	...	...	306	7	756
	Carnarvon ...	29·964	30·070	30·182	29·731	75·9	61·5	68·7	83·0	52·0	79·4	57·3	91·3	43·0	527	17	825
	Hamelin Pool...	29·960	30·080	30·180	29·710	75·0	59·0	67·0	85·0	51·0	77·1	55·8	89·8	44·2	398	10	558
	Geraldton ...	29·950	30·113	30·192	29·652	73·8	59·8	66·8	85·6	52·2	74·1	55·2	89·0	39·3	604	16	715
Inland:	Hall's Creek ...	30·008	30.071	30·248	29·833	86·2	54·9	70·6	99·5	43·4	84·1	55·6	98·0	36·4	9	1	488
	Marble Bar ...	...	...	...	...	88·6	62·2	75·4	96·5	51·0	87·9	60·5	95·0	44·0	207	6	758
	Nullagine ...	29·984	30·063	30·179	29·898	84·3	57·6	71·0	94·0	49·0	81·6	52·4	91·0	38·0	202	3	421
	Peak Hill ...	30·001	30·108	30·160	29·770	75·0	56·0	65·0	89·0	46·0	73·1	52·5	86·2	38·8	153	7	375
	Wiluna ...	...	30·108	30·373	29·756	74·6	54·0	64·3	91·0	39·0	73·1	49·1	80·9	31·9	55	4	298
	Cue ...	30·000	30·130	30·310	29·760	72·0	54·0	63·0	93·0	42·0	74·4	51·2	91·0	35·9	349	12	507
	Murgoo ...	...	...	...	...	73·0	54·9	64·0	92·0	44·0	...	...	...	...	232	8	294
	Yalgoo ...	29·968	30·126	30·232	29·666	72·3	54·5	63·4	93·1	44·0	72·9	49·8	92·2	35·7	117	10	454
	Lawlers ...	30·000	30·150	30·289	29·707	72·6	54·5	63·6	90·3	43·2	70·3	49·4	86·0	33·1	300	13	556
	Laverton ...	30·004	30·162	30·332	29·724	71·9	53·7	62·8	91·8	41·9	69·8	48·8	87·9	30·7	2	10	590
	Menzies ...	30·000	30·174	30·307	29·688	69·7	51·2	60·4	88·9	39·8	68·6	48·4	89·0	32·1	203	7	305
	Kanowna ...	...	...	...	...	68·7	49·1	58·9	87·5	39·0	...	...	...	...	160	12	330
	Kalgoorlie ...	30·000	30·180	30·358	29·626	69·0	50·9	60·0	87·0	39·0	67·8	48·5	88·1	34·5	172	14	330
	Coolgardie ...	29·982	30·182	30·358	29·665	67·9	49·6	58·8	86·2	38·0	67·7	47·5	88·4	35·1	163	13	381
	Southern Cross	29·982	30·152	30·314	29·589	68·7	48·1	58·4	83·5	35·5	68·8	45·0	90·0	30·8	185	8	309
	Kellerberrin ...	...	...	...	...	...	...	...	...	...	...	...	...	...	313	16	400
	Walebing * ...	...	...	...	...	66·2	49·0	57·6	85·0	38·0	68·1	46·7	81·7	31·4	510	19	624
	Northam * ...	...	...	...	...	67·2	49·5	58·4	85·0	39·0	68·5	46·4	81·1	34·3	406	18	543
	York ...	29·940	30·156	30·310	29·540	68·0	48·0	58·0	84·0	38·0	69·5	45·3	85·0	32·0	518	20	663
	Guildford ...	...	...	...	...	68·4	53·9	61·2	82·4	43·4	69·6	49·7	85·0	33·5	860	22	1,044

* Averages for three years only.

The Climate of Western Australia during May, 1905—*continued.*

	Locality.	Barometer (corrected and reduced to sea-level).				Shade Temperatures.									Rainfall.		
						May, 1905.					Average for previous Years.						
		Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
SOUTH-WEST AND SOUTH COAST:	Perth Gardens ...	29·924	30·119	30·271	29·522	67·6	55·8	61·7	78·0	46·2	69·9	50·5	92·0	35·0	848	21	1,049
	Perth Observatory	29·932	30·114	30·294	29·503	67·6	55·5	61·6	78·3	45·6	68·8	52·3	82·4	39·9	871	23	1,082
	Fremantle ...	29·944	30·130	30·280	29·497	67·4	57·7	62·6	78·0	49·5	68·0	54·9	80·4	43·0	732	24	837
	Rottnest ...	29·926	30·121	30·277	29·487	67·4	57·3	63·4	75·8	49·6	68·0	57·3	78·0	45·0	759	21	897
	Mandurah ...	...	...	...	...	67·5	53·9	60·7	77·4	42·0	68·5	49·1	80·7	36·5	1,019	19	1,257
	Marradong ...	...	...	...	...	...	...	...	...	...	...	...	...	...	865	18	1,037
	Wandering ...	...	...	...	...	67·0	47·3	57·2	76·0	36·2	...	...	...	...	766	16	916
	Narrogin ...	...	...	...	...	61·3	42·4	51·8	75·0	38·0	...	...	...	...	683	22	906
	Collie	...	...	...	...	64·5	43·6	54·0	75·1	33·4	65·3	41·1	77·4	29·0	940	23	1,157
	Donnybrook * ...	...	...	...	...	65·3	48·1	56·7	75·2	35·7	66·9	45·8	78·1	33·0	1,134	23	1,344
	Bunbury ...	29·922	30·142	30·296	29·463	67·0	53·5	60·2	78·0	40·5	68·5	50·4	82·0	36·0	877	21	1,089
	Busselton ...	...	...	...	...	66·2	51·8	59·0	76·0	40·0	67·0	48·3	77·7	35·0	767	20	887
	Cape Naturaliste	29·874	...	30·293	29·319	64·2	54·3	59·2	70·0	46·2	...	...	...	...	745	21	930
	Bridgetown ...	...	...	...	...	64·4	44·5	54·4	75·2	36·0	66·0	41·5	77·9	27·6	759	22	1,004
	Karridale ...	29·849	30·130	30·293	29·353	64·4	51·9	58·2	75·0	39·0	67·8	48·4	81·1	32·5	1,280	24	1,700
	Cape Leeuwin ...	29·822	30·088	30·280	29·239	65·0	53·0	59·0	72·0	49·0	66·2	56·3	78·8	44·9	961	24	1,287
	Katanning ...	29·870	30·150	30·320	29·473	63·0	48·0	55·5	74·0	37·0	65·2	44·1	79·0	30·5	403	18	599
	Mt. Barker ...	...	...	...	...	62·5	45·9	54·2	69 5	36·5	...	...	...	...	407	21	1,075
	Albany	29·874	30·128	30·360	29·356	64·8	49·3	57·0	74·0	41·4	65·6	48·7	80·0	35·1	601	20	1,144
	Breaksea... ...	29·878	30·126	30·367	29·344	59·4	53·4	56·4	70·8	42·0	64·2	54·0	78·2	43·0	581	25	1,146
	Esperance ...	29·952	30·170	30·426	29·516	67·8	50·4	59·1	76·5	37·2	68·0	49·9	86·0	35·0	198	16	1,184
	Balladonia * ...	30·009	30·186	30·470	29·614	68·6	48·9	58·8	88·2	38·0	67·6	46·3	87·6	34·6	137	12	349
	Eyre	30·080	30·188	30·414	29·562	74·7	51·1	62·9	92·2	35·5	68·3	48·4	91·2	34·0	217	13	361

INTERSTATE.

Locality.	Mean of 9 a.m. and 3 p.m.	Average for previous years.	Highest for Month.	Lowest for Month.	Mean Max.	Mean Min.	Mean of Month.	Highest Max.	Lowest Min.	Mean Max.	Mean Min.	Highest ever recorded.	Lowest ever recorded.	Points (100 to inch) in Month.	Wet Days.	Total Points since Jan. 1.
Perth	29·932	30·114	30·294	29·503	67·6	55·5	61·6	78·3	45·6	69·0	52·3	82·4	39·9	871	23	1,082
Adelaide	30·070	30·149	30·518	29·344	67·8	51·1	60·0	85·2	40·8	65·2	50·0	88·3	36·9	357	11	914
Melbourne	30·052	30·023	30·572	29·322	63·7	47·6	55·6	83·7	38·4	61·4	46·5	82·1	31·3	297	9	1,225
Sydney	30·070	30·091	30·500	29·350	66·0	53·0	60·0	76·0	48·0	64·8	52·0	83·5	40·2	520	10	2,366

* Averages for three years only.

The Observatory, Perth, 9th June, 1905.

W. E. COOKE, Government Astronomer.

RAINFALL for April, 1905 (completed as far as possible), and for May, 1905 (principally from Telegraphic Reports).

STATIONS.	APRIL.		MAY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EAST KIMBERLEY:				
Wyndham	38	2	Nil	...
6-Mile	...	...	...	...
The Stud Station	...	...	...	...
Carlton	69	2	...	...
Rosewood Downs	...	...	...	...
Argyle Downs	...	...	...	...
Lisadell	...	...	..	...
Turkey Creek	42	2	Nil	...
Ord River	...	...	...	...
Alice Downs	...	...	...	...
Hall's Creek	41	3	9	1
Nicholson Plains	...	...	...	...
Flora Valley	61	3	...	...
Ruby Plains	...	...	...	...
Denison Downs	...	...	...	...
WEST KIMBERLEY:				
Obagama	Nil	...	...	...
Beagle Bay	155	3	...	...
Pt. Torment	31	2	...	...
Derby	Nil	...	6	1
Yeeda	32	2	...	...
Liveringa	...	...	...	...
Leopold Downs	111	3	...	...
Fitzroy Crossing	79	2	1	1
Fitzroy (C. Blythe)	...	...	...	...
Quanbun	206	3	...	...
Nookanbah	...	...	...	...
Broome	Nil	...	118	3
Roebuck Downs	37	1	...	...
Thangoo	...	...	...	...
La Grange Bay	2	1	196	4

STATIONS.	APRIL.		MAY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST:				
Wallal	20	1	215	5
Condon	28	1	201	6
Pardoo	Nil	...	...	...
DeGrey River	118	1	...	...
Port Hedland	9	2	379	6
Boodarie	...	...	...	...
Warralong	40	1	...	...
Muccan	...	...	...	...
Ettrick	...	...	...	...
Mulgie	...	..	...	...
Eel Creek	...	...	...	...
Station Peake	155	3	...	...
Coongon	...	...	...	...
Warrawagine	...	...	...	...
Bamboo Creek	26	2	144	4
Marble Bar	Nil	...	207	6
Warrawoona	3	1	169	4
Corunna Downs	...	...	...	...
Nullagine	10	1	202	3
Mt. Edgar	...	...	..	...
Kerdiadary	N	...	...	...
Roy Hill	...	...	...	...
Middle Creek	N 1	...	...	...
Mosquito Creek	N	...	...	...
Mulga Downs	7	1	...	...
Woodstock	Ni	...	...	...
Mt. Florence	...	...	...	...
Tambrey	Nil	...	...	...
Millstream	30	1	...	...
Yandyarra	...	...	...	...
Mallina	...	...	...	..
Whim Creek	Nil	...	269	3
Cooyapooya	Nil	...	...	...
Woodbrooke	...	...	...	...

RAINFALL—*continued.*

STATIONS.	APRIL.		MAY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
NORTH-WEST—*cont.*				
Croydon	Nil	...	...	...
Balla Balla	...	...	...	...
Roebourne	Nil	...	265	5
Cossack	Nil	...	416	5
Sherlock	Nil	...	...	...
Fortescue	Nil	...	256	4
Mardie	...	...	...	...
Mt. Stewart	...	...	...	...
Yarraloola	Nil	...	...	...
Chinginarra	...	...	...	...
Onslow	Nil	...	230	7
Peedamullah	42	1	...	...
Red Hill	...	...	...	...
Mt. Mortimer	Nil	...	...	...
Peake Station	23	1	...	...
Wogoola	...	...	...	...
Nanutarra	...	...	...	...
Yanrey	...	...	...	...
Point Cloates	...	...	...	...
GASCOYNE:				
Winning Pool	Nil	...	306	7
Coordalia	...	...	...	...
Towara	84	1	...	...
Ullawarra	Nil	...	...	...
Maroonah	...	...	...	...
Gifford Creek	...	...	...	...
Bangemall	...	...	...	...
Mt. Augustus	...	...	...	...
Minnie Creek	Nil	...	...	...
Yanyeareddy	...	...	...	...
Williambury	...	...	...	...
Booloogooroo	...	...	...	...
Wandagee	...	...	...	...
Bernier Island	...	...	...	...
Boolathana	2	1	...	...
Carnarvon	13	2	327	19
Brick House	46	2	...	...
Doorawarrah	12	1	...	...
Bintholya	5	1	...	...
Mungarra	...	...	...	...
Clifton Downs	...	...	...	...
Dairy Creek	Ni	...	...	...
Upper Clifton Downs	...	...	...	..
GASCOYNE—*contd.*				
Dirk Hartog Island	82	2	374	12
Sharks Bay	37	1	499	14
Kararang	62	2	...	...
Meedo	...	...	...	...
Tamala	68	3	...	...
Wooramel	27	4	277	...
Hamelin Pool	17	3	398	10
Byro	37	2	...	...
Yarra Yarra	Ni	...	...	...
Berringarra	18	2	...	...
Mt. Gould	...	...	...	...
Moorarie	26	2	...	...
Wandary	Nil	...	...	...
Peak Hill	50	2	153	7
Mt. Fraser	...	...	...	...
Abbotts	Nil	...	165	6
Belele	Nil	...	374	10
Mileura	14	2	429	13
Milly Milly	22	2	372	10
Manfred	17	3	496	13
New Forest	24	...	...	...
Woogorong	38	1	275	11
Boolardy	...	...	...	...
Twin Peaks	...	...	...	...
Billabalong	Nil	...	...	...
Wooleane	10	1	253	7
Woolgorong	5	4	...	...
Murgoo	41	2	232	8
Yallalonga	4	1	...	...
Meka	98	1	257	7
Mt. Wittenoom	46	2	282	10
Nannine	7	1	369	10
Star of the East	Nil	...	309	7
Annean	...	...	...	...
Coodardy	i	...	259	8
Cue	6	1	349	12
Day Dawn	12	1	377	6
Lake Austin	101	1	333	7
Lennonville	56	2	385	12
Mt. Magnet	46	3	281	13
Challa	21	2	227	12
Youeragabbie	Nil	...	355	8
Black Range	30	3	349	11
Murrum	25	2	212	8
Burnerbinmah	90	5	...	...
Barnong	39	3	...	...

RAINFALL—*continued.*

STATIONS.	APRIL.		MAY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
GASCOYNE—*contd.*				
Mellenbye	70	4	242	13
Yalgoo	44	3	225	10
Wagga Wagga ...	43	3	263	13
Gabyon	28	1	283	10
Tallyrang ...	Nil	...	358	12
Gullewa	20	3	...	...
Muralgarra ...	57	2	259	10
Wydgee	87	3	...	...
Gullewa House ...	55	4	...	...
SOUTH-WEST DIVISION (NORTHERN PART):				
Murchison House	54	4	...	...
Mt. View ...	3	1	...	...
Mumby	39	5	433	13
Yuin	Nil	...	...	...
Northampton ...	53	5	446	14
Narra Tarra ...	...	...	...	...
Tibradden ...	62	6	493	16
Myaree	92	4	563	14
Sand Springs ...	43	3	...	...
Mullewa... ...	18	5	424	12
Kockatea ...	16	4	445	9
Geraldton ...	49	5	604	16
White Peak ...	...	...	615	10
Greenough ...	93	3	485	14
Bokara	105	4	554	17
Dongara ...	55	4	725	14
Brookman's Hills	53	3	387	15
Strawberry ...	40	3	555	17
Nangetty ...	...	...	...	...
Mingenew ...	57	4	506	16
Urella	28	1	544	13
Yandenooka ...	22	1	502	15
Rothesay ...	...	...	...	...
Condingnow ...	35	3	...	...
Field's Find ...	37	5	...	...
Carnamah ...	56	5	442	13
Watheroo ...	51	3	422	17
Dandaragan ...	115	5	575	17
Moora	54	4	431	14
Yatheroo ...	92	3	597	14
Walebing ...	67	5	510	19
Round Hill ...	42	4	539	14
New Norcia ...	104	4	474	15
Wannamel ...	182	5	672	18
SOUTH-WESTERN DIVISION, CENTRAL (COASTAL):				
Gingin	126	5	793	18
Belvoir	173	4	901	18
Wandu	219	9	847	24
Guildford ...	143	5	860	22
Kalbyamba ...	155	4	899	23
Canning W't'r'w'ks	211	4	1124	18
Perth Gardens ...	157	5	848	21
Perth Observatory	164	5	871	23
Subiaco	152	4	840	20
Claremont ...	...	...	847	...
Forest Dale ...	386	8	...	...
Jandakot ...	126	4	994	17
Fremantle ...	76	4	732	24
Rottnest... ...	117	4	...	...
Armadale ...	153	3	908	19
Rockingham ...	144	4	695	17
Jarrahdale (Norie)	...	...	1251	22
Jarrahdale ...	198	6	1368	22
Serpentine ...	160	6	1046	21
Mandurah ...	184	4	1019	19
Blythewood ...	...	...	921	23
Pinjarra	180	4	925	19
Yarloop	81	4	913	22
Harvey	85	5	977	22
Upper Murray ...	184	5	1092	23
SOUTH-WEST, CENTRAL PART (INLAND):				
Dowerin ...	59	3	421	15
Momberkine ...	64	3	345	14
Newcastle ...	72	5	607	19
Eumalga ...	115	5	648	20
Northam ...	105	6	406	18
Grass Valley ...	101	4	354	15
Meckering ...	69	4	347	17
Cunderdin ...	106	4	397	15
Codg-Codgin ...	66	3	...	...
Yarragin ...	67	3	...	...
Doongin... ...	78	3	233	10
Cutenning ...	133	6	309	16
Whitehaven ...	131	5	459	14
Sunset Hills ...	116	5	...	...
Cobham	132	5	455	18
Yenelin	97	3	...	...
Mt. Caroline ...	69	3	267	12

RAINFALL—*continued*.

STATIONS.	APRIL.		MAY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
SOUTH-WEST, CENTRAL—*contd.*				
York	129	7	518	20
Dalebridge ...	165	6	469	21
Beverley ...	201	5	671	...
Bally Bally ...	177	7	448	16
Bakdale	...	...	493	10
Barrington ...	166	3	448	16
Qualin	164	4	465	12
Stock Hill ...	166	5	545	15
Sunning Hill ...	172	7	567	19
Brookton ...	125	4	520	16
Wandering ...	125	4	766	16
Glen Ern ...	193	7	...	...
Pingelly ...	188	5	535	15
Yornan	198	7	456	16
Marradong ...	127	4	971	19
Bannister ...	...	...	855	17
Wounaminta ...	150	7	...	...
Narrogin ...	171	7	599	18
Narrogin State Farm	190	7	683	22
Wickepin ...	218	5	...	...
Gillimaning ...	146	5	...	...
Bunking ...	119	3	...	...
Bullock Hills ...	140	6	...	...
SOUTH-WEST DIVISION (SOUTHERN PART):				
Bunbury ...	121	9	877	21
Brunswick ...	147	3	1,017	21
Collie	134	6	940	55
Glen Mervyn ...	335	7	1,077	21
Donnybrook ...	181	7	1,134	23
Boyanup ...	164	5	874	24
Ferndale ...	203	6	1,102	21
Busselton ...	73	6	767	20
Quindalup ...	80	4	844	19
Cape Naturaliste	137	4	745	21
Glen Sossie ...	...	...	688	22
Lower Blackwood	202	4	853	18
Karridale ...	394	14	1,280	24
Cape Leeuwin ...	234	13	961	24
Biddellia ...	434	7	814	24
The Warren ...	244	8	693	17
Lake Muir ...	304	12	...	...
The Peninsula ...	163	11	840	27
SOUTH-WEST—*continued*.				
Mordalup ...	252	10	...	...
Deeside	293	11	...	...
Riverside ...	200	9	..	...
Balbarup ...	275	5	328	13
Wilgarup ...	219	10	748	23
Denningup ...	268	6	591	19
Bridgetown ...	185	10	759	22
Westbourne ...	295	10	...	...
Hilton	209	7	689	17
Greenbushes ...	260	7	1,021	18
Greenfields ...	358	6	826	20
Glenorchy ...	185	5	579	17
Williams ...	113	6	641	21
Arthur	150	4	492	17
Darkan	149	2	606	12
Wagin	166	5	490	15
Glencove ...	162	8	348	19
Dyliabing ...	147	9	317	16
Katanning ...	161	7	403	18
Kojonup ...	337	7	752	21
Broomehill ...	209	10	408	16
Sunnyside ...	215	10	458	19
Talbot House ...	140	6	530	16
Woodyarrup ...	194	9	337	16
Mianelup ...	231	4	259	18
Cranbrook ...	255	7	338	18
Toolbrunup ...	303	10	248	13
Tambellup ...	412	11	...	...
Woogenellup ...	249	9	385	19
Mt. Barker ...	545	13	407	21
Kendenup ...	480	10	440	18
St. Werburgh's...	532	11	339	20
Forest Hill ...	532	13	523	25
Wilson's Inlet ...	...	...	681	15
Denmark ...	400	11	...	...
Grasmere ...	342	13	633	20
Albany	327	15	601	20
King River ...	504	8	443	14
Point King ...	326	13	465	18
Breaksea ...	386	19	581	25
Cape Riche ...	509	8	...	...
Cherilallup ...	150	7	403	15
Pallinup... ...	166	4	368	17
Bremer Bay ...	581	9	259	18
Peppermint Grove	664	14	...	...
Jarramongup ...	190	13	...	...
Chillinup ...	196	5	...	...

RAINFALL—*continued.*

STATIONS.	APRIL.		MAY.	
	No. of points. 100 = 1in.	No. of wet days.	No. of points. 100 = 1in.	No. of wet days.
EASTERN DIVISION:				
Dural	37	3	...	...
Wiluna	35	4	55	4
Gum Creek ...	47	1	217	4
Mt. Sir Samuel ...	60	4	365	6
Lawlers	174	6	300	13
Leinster G.M. ...	...	...	...	...
Darda	49	5	315	8
Duketon ...	55	4	...	...
Mt. Leonora ...	31	3	426	8
Mt. Malcolm ...	13	1	414	8
Mt. Morgans ...	12	1	409	8
Laverton ...	43	3	462	10
Murrin Murrin...	5	1	343	7
Yundamindera ..	12	1	402	8
Tampa	23	1	327	6
Kookynie ...	60	6	386	7
Niagara	46	5	332	7
Yerilla	49	4	445	10
Quandinnie ...	34	5	...	...
Edjudina ...	92	7	385	11
Menzies	79	5	203	7
Mulline	25	7	251	12
Waverley ...	60	6	240	13
Goongarrie ...	19	5	146	...
Mulwarrie ...	51	4	225	14
Bardoc	42	3	168	6
Broad Arrow ...	39	4	200	9
Kurnalpi ...	29	4	193	9
Bulong	18	3	183	8
Kanowna ...	46	4	160	12
Kalgoorlie ...	43	3	172	14
Coolgardie ...	67	5	163	13
Burbanks ...	...	...	342	12
Woolubar ...	72	4	159	9
Widgiemooltha...	82	7	180	12
50-Mile Tank ...	65	5	162	8
Waterdale ...	90	7	...	...
Norseman ...	111	7	189	12
Lake View ...	168	7	...	...
Bulla Bulling ...	53	3	215	10
Boondi	38	6	196	11
Boorabbin ...	60	5	209	13
EASTERN—*contd.*				
Koorarawalyee ..	42	4	231	14
Karalee	62	3	230	7
Yellowdine ...	81	4	148	8
Southern Cross...	27	2	185	8
Parker's Range...	31	8	147	14
Parker's Road ...	26	1	203	10
Mt. Jackson ...	24	2	120	9
Bodallin ...	60	2	187	9
Burracoppin ...	39	2	...	...
Kellerberrin ...	69	4	313	16
Merriden ...	32	3	255	11
Nangeenan ...	40	2	257	9
Mangowine ...	62	2	...	...
Wattoning ...	Nil	...	...	...
Noongarin ...	30	1	257	9
EUCLA DIVISION:				
Ravensthorpe ...	277	14	142	17
Coconarup ...	202	11	...	...
Hopetoun ...	434	8	...	...
Fanny's Cove ...	383	10	...	...
Park Farm ...	307	11	...	...
Esperance ...	464	12	189	15
Gibson's Soak ...	343	10	...	...
30-Mile Condenser	303	11	...	...
Swan Lagoon ...	494	11	...	...
Grass Patch ...	...	...	...	...
Myrup	450	12	...	...
Lynburn ...	...	...	...	...
Boyatup... ...	489	11	...	...
Middle Island ...	...	...	...	...
Point Malcolm ...	...	...	...	...
Israelite Bay ...	220	12	286	20
Balbinia... ...	119	7	...	...
Frazer Range ...	63	3	120	8
Balladonia ...	57	7	137	12
Southern Hills...	68	5	...	...
Eyre	46	7	217	13
Mundrabillia ...	37	5	...	...
Eucla	78	7	78	11

The Observatory, Perth,
9th June, 1905.

W. E. COOKE,
Government Astronomer.

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